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Original Communications.

A CENTURY'S PROGRESS IN THERAPEUTICS.[1]

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Trousseau said: "The practice of medicine is the art of curing, and it is nothing more than that; to cure is its object, and all our plans must culminate in medico-chirurgical therapeutics." Broussias expressed a similar thought in these words: "The real physician is the one who cures; the observation which does not teach the art of healing is not that of a physician, it is that of a naturalist." And Draper adds: "Mastery of all the sciences upon which medicine is founded does not make the physician. He would be helpless without them, but he is worse than helpless with them until he has learned how to use them, how to construct out of them the special art which enables him to cure disease." And George Eastes, in his Hunterian Oration in 1895, sums up the advantages of a thorough knowledge of the healing art in these pregnant words: "Increasing mastery over disease gives added zest to work, and the more frequent recovery of patients augments much our pleasures of life." It is because of the many slighting observations on the advancement of general therapeutics, in

[1]Read at the centennial celebration of the Madison County Medical Society.

comparison with the marvelous achievements of pathology and bacteriology and surgery during the last fifty years, that I have chosen to quote from these authors ancient and modern. The cheap slur of Voltaire that "doctors are people who pour drugs of which they know little into bodies of which they know less" is too frequently accepted as something more than a witticism. If there is no hope in therapy, there is no incentive to the study of medicine. The inspiration of all physicians, ancient and modern alike, was beautifully expressed by Sir James Paget at the close of an address on a kindred subject in these words: "In the realm of mind mortal man may accomplish that which will be immortal."

At the beginning of the century there was no question in the minds of practitioners as to what their duties were. Pathology as it is to-day was practically unknown. But the same diseases which lay low their victims to-day were intimately known and were accurately observed. The practitioner of that day knew it as his duty to combat their manifestations by every means at his command. By empirical methods and by methods of inductive reasoning he had ascertained the curative properties of many remedies the efficacy of which a later science has explained on other grounds than simply those of experience or of reasoning. It may be well to pass in review the measures which our ancestors used in those early days. Of remedies other than drugs there were not a few, and I cannot do better than epitomize the remarks of Griswold in his address on "Remedies Used 100 Years Ago." There was the cautery, "a sovereign remedy in spinal diseases and not used often enough now;" the moxa, "serviceable in sciatic pain, one application of which would average more good than a hundred daubs of iodine;" the cupping glass, wet or dry, "affording much relief in localized pain, inflammatory or neuralgic;" the Spanish fly-blister, "happily still largely in service;" the issue, "a splendid remedy in subacute or chronic conditions;" the seton, "one of the best remedial inventions the profession has ever possessed—the supreme counter-irritant;" the leech, "which helped to pump the poison from a pleuritic chest and thus softened the intensity of the congestion;" the clyster, the crude forerunner of the modern enema; the poultice, of various substances, but always mollifying by the application of heat and moisture; phlebotomy, "which in pneumonia and heart disease, if not in other conditions, signally aided the suffering and often saved life;" the sweat, however accomplished, aiding the body to eliminate poisonous substances.

Of remedies for internal administration he was limited largely to botanical drugs, many of them indigenous, and the collection and preservation of which was part of his work. These were administered in the crude state or in decoctions or in other hardly less disagreeable forms. But he knew the virtues of the "sacred bark," and had proven its curative properties in "swamp fever" as absolutely as we can now demonstrate the efficacy of quinine in killing the malarial plasmodia. He had demonstrated the restorative powers of steel in the "green sickness," and had established the specific effect of mercury and iodine in pox. He possessed an array of cathartics, both vegetable and saline as well as mercurial, and knew how to use them. He was a master of antimony and used it to excess, as we moderns are tempted to abuse modern antipyretics. He valued opium above all drugs, and knew the intelligent use of alcohol. Besides the vegetable astringents which he gathered from fields and forests and gardens, he had learned the efficacy of lead. One of the most interesting letters from my grandfather to his son describes vividly the successful treatment of a serious pulmonary hemorrhage by the use of lead and opium in exactly the same manner as is recommended by Jacobi in his address published in *American Medicine* of December 23, 1905. Thus it will be seen that his armamentarium medicinæ was not so small as one might imagine. The skilful man of the past had intimate knowledge of his weapons of defense and used them bravely and heroically. He possessed none of the instruments of precision upon which we are wont to depend in making an examination of a patient, but by his habit of minute observation of the patient and of his excretions, by the accurate study of the pulse, by the estimation of body temperature, and by palpation with the trained hand, he seldom failed in establishing a reasonable basis for treatment.

But while we willingly accord the high-

est honors to those physicians of the early part of the century who used intelligently the remedial measures which experience had proved valuable, we must recognize the influences which have advanced medical science and endeavor to trace their effects upon modern therapeutic methods.

The science of anatomy at first concerned itself with observations of the human body as a whole. It then advanced to a consideration of the various component parts of the body. With the discovery of the microscope its investigations went further, and every tissue was investigated. By years of research and by a technique increasingly delicate, it has finally been established that each apparently homogeneous mass of tissue is made of cellular elements, each species after its own kind, and that each cell has its own anatomical structure similar to, though not as complicated as, that of the body of one of the higher forms of animal life.

In physiology the progress was along the same paths, until now the physiology of the component cells of the body is under minutest examination and is largely understood.

Pathology felt a similar impulse. It was fifty years ago that Virchow announced his doctrine of cellular pathology, which investigators the world over have confirmed as the true basis for the scientific study of the manifestations of disease. Though there are many historical proofs that several early observers considered the possibility of the existence of particular entities which, by gaining entrance into the human body, produced the diseases which had long been recognized as infectious or contagious, it remained for the investigators of the past half-century to demonstrate conclusively the causative influence of specific bacteria in the production of this class of diseases. To-day the list of such diseases, the specific causative entities of which are known, is long, and industrious investigators are increasing it from day to day.

Keeping pace with or leading the advance in kindred sciences, chemistry has developed with such leaps and bounds that he who has not kept up with it can hardly read a page of a modern text-book intelligently.

Early in the century there was a growing belief in the self-limitation of many diseases. This it was which gave the original impulse to the investigations of the physiological actions of drugs, for if they were not accountable for the control of the disease, it must be determined what they did accomplish. Headland was the earliest English writer whose attempts to explain "The Action of Remedies" were of importance. With the establishment of laboratories for investigation, made possible by the improvements in chemistry, anatomy, physiology, and pathology, many laborers entered into this field and demonstrated the effect of the most important remedies upon the lower animals, as shown by changes in blood-pressure, nervous phenomena, changes of secretions, etc., and corroborated them by observations of their effect on man, so that for many years we have had a fair knowledge of what to expect from the administration of the more active remedies. These investigations have greatly advanced rational therapeutics. It is natural that the influence of the investigation of the anatomy, the physiology, the pathology, and the bacteriology of cellular structures should have stimulated the investigation of the effect on cells of various drugs. The difficulties of such investigations are great, but until they are completed we cannot claim that therapeutics is a pure science. Until then the inductive method and empiricism must divide the field with science. Brunton says: "In the case of aniline colors we can *see* that different cells or different parts of the same cell exercise a selective power, taking one and refusing another. It is probable that the same thing occurs in the case of other substances which we cannot see under the microscope, and that strychnine, for instance, unites with the cells of the spinal cord rather than with those of bone or cartilage or muscle." While pharmacology formerly dealt with the action of drugs upon general functions, it now localizes their action to the tissues and to the individual cells on which they act. The number of remedial agents is so great and experimentation so laborious that our knowledge of their exact mode of action is not yet complete even of the most important ones. Because of this great difficulty scientific therapeutics must be expected to be the last of the sciences of medicine to attain perfection.

While it will thus be seen that pathology gives the terms of the problem to therapeutics and is its true inspiration, it is nevertheless a fact that pathological studies in the middle of the past century had an influence distinctly antagonistic to therapeutics and were the cause of the advent of the school of nihilists in therapeutics, all of whose adherents are not yet dead. Because the natural history of diseases was made plain and it was demonstrated that their manifestations had a beginning, an increase, an acme, and a decline, like the tide of the sea, it was reasoned that, like the rising tide, they could not be influenced by the interference of physicians. But nothing in the pathology of smallpox would have led to the use of vaccine as a cure or a preventive, nor would an intimate knowledge of the natural history of malaria have suggested the use of quinine to control it. But "as pathological processes are traced back where function begins its deviation from the normal and the causes underlying their deviation gradually become recognizable, the means of prevention and the indications for treatment become obvious" (Barker). Pathology is necessary to the therapeutist, but the knowledge of curative remedies is not essential to the pathologist. From this point of therapeutic nihilism, due to the concentration of the professional mind upon pathological studies, the pendulum has swung back and is now somewhere near its proper place. Pathology did greatly stimulate diagnosis and was the direct incentive of the elaboration of the several methods of physical examination which are now constantly employed by every educated physician, and which are a distinct gain upon the older methods relied upon by our fathers. But the acute diagnostician who boasts that the pathologist always confirms his diagnosis in the dead-house is a naturalist, not a physician. Spender wrote: "To make a sick man hopeful of being cured we must show him that our resources are many; that our faith is firm and deep; and that therapeutics is as dear to us as truth in diagnosis."

After this brief sketch of the recognized advances in some of the basal sciences of medicine which have a bearing on therapeutics, it will be interesting to review what are considered the most important improvements in the treatment of the sick. Perhaps the most significant difference between the practice of the physician of to-day and that of his grandfather is the recognition that, with the few exceptions in which a specific curative treatment has been discovered, disease is not to be attacked as an invading foe, but the patient in its power is to be so managed as to make his own vital forces equal to the task of overcoming it. Dr. S. S. Cohen puts it thus: "The most active remedial agents the physician can employ are those produced within the animal body itself in its physiological functions and compensations and in its resistance to the attacking agents of disease. Interference must aim to restore the balance of function." Von Leyden says: "The task of therapy is to help the patient as far as possible with the means at his disposal at the time; it does not postpone the treatment to future discoveries. Specific therapy, long looked upon as that alone which is safe and worth striving for, is deprived of its absolute dominion; instead of curing disease, our task is altered to making people well." Accordingly, increasing attention is paid to putting the patient in the best possible condition for recovery. The value of a suitable room for the sick, the appreciation of the beneficence of pure air and of sunlight, attention to the minutest details of nutrition by foods appropriate to the condition of the patient and to his diseased organs, the careful correction of imperfect elimination of the waste products of metabolism, and the protection of the patient from annoyances that disturb his nervous equilibrium, are daily more highly appreciated as essentials to success in treatment. All of these conditions can be satisfactorily attained only by the aid of an efficient and intelligent nurse, who is one of the most important agencies in successful treatment which the latter half of this past century has developed.

Possibly of even more importance is our greater knowledge of how to prevent the spread of diseases that are known to be infectious or contagious. Prophylaxis is the high aim of every conscientious physician. When one contemplates the fact that our knowledge is exact as to how to prevent the ravages of smallpox by vaccination, of typhoid fever by the destruction of the infectious principles in the excretions, of malaria and yellow

fever by controlling the breeding-places of certain mosquitoes or by protection from them, of tuberculosis by destruction of the bacilli in the sputum and discharges from local lesions, of diphtheria and scarlet fever by rigid quarantine and the use of specific sera, it is appalling and discouraging to know that through ignorance, prejudice, and carelessness these diseases are still slaying their thousands and tens of thousands. A certain amount of responsibility for this condition of things inevitably rests upon the shoulders of members of our profession. That much has been accomplished in the prophylaxis of disease cannot be gainsaid. The introduction of public water systems and of sewers, the laws requiring notification of communicable diseases, the isolation of the patient, and the disinfection of the house at the termination of the disease, caused a decrease in the death-rate from zymotic diseases in London of 30 per cent in the first decade during which these laws were enforced, although the general death-rate fell but 3 per cent. In England prophylaxis is better carried out than in any other country. Until we adopt the policy, there long observed, of requiring special education of such physicians as would enter the public health service, even in the most obscure country districts, we must expect such inefficiency in health officers and such carelessness in many practicing physicians as make possible our present uncomplimentary record in controlling communicable diseases. Prophylaxis is one of the most significant evidences of progress in therapeutics which the past half-century has developed. We have had very recently most convincing evidence of what can be accomplished by the strict observance of its laws in the remarkable records from the medical and surgical staffs of the army and navy of Japan.

During the century which has passed there has been a most noticeable improvement in pharmacy. The recent edition of the U. S. Pharmacopœia represents the highest standards attained by the great mass of American physicians. It is at last fully recognized that it is not the peculiar duty of plants to produce their medicinal virtues in exact amounts, but simply to grow as best they can under conditions which environ them. Consequently in order to obtain reliable preparations from them each specimen must be assayed and made to conform to a uniform standard of strength. The use of unreliable preparations of drugs is one of the important reasons why therapeutics has not advanced so rapidly as have other sciences. Physicians have told me that they have never seen any effect whatever from the use of digitalis. I have been compelled to reply that either they had never used a good preparation of this invaluable drug or they had not observed accurately its effects.

The isolation of the alkaloids of the most active drugs is a gift of the past century. Their number is constantly increasing, and is now so large that there is hardly a botanical drug, the use of which is often indicated, that cannot be had in this form. Accuracy of effect and ease of administration are both assured by their use.

The rapid advances of chemistry have placed in our hands a long array of synthetic remedies that have greatly increased our ability to cure the sick. Under the stimulus of antipyretic treatment of all febrile diseases, which was an unwarranted conclusion from the observations of the effect of quinine on the fever in malaria and of salicylic acid in that of articular rheumatism, a large number of synthetic antipyretics were produced which are powerful in reducing fever, and most of which are also potent as analgesics. Their use was carried to extremes, and, in the case of acetanilide in particular, has been productive of harmful results. Now that fever has been shown to be a conservative process and not a phenomenon to be savagely attacked, more care in their indiscriminate use is noted. But they are on the market in every conceivable form, and their effects are often so magical at first that they are enormously used without the physician's prescription. Among the most significant demonstrations of the effect of temperature in disease is this: the pneumococcus, the specific cause of lobar pneumonia, is destroyed by an exposure to a temperature of 104° F. or more for three or four days, whereas at a lower temperature, but that above normal in man, its destruction is not accomplished in less than fourteen days (George Eastes's Hunterian Oration,

1895). The deduction is not only logical but clinically true, that he who effects a diminution in temperature in pneumonia by drug interference, by so much diminishes the prospects of rapid recovery in his patient.

It is claimed that whatever modern chemistry can analyze it can reproduce by a similar combination of the same elements derived from other sources. In this way many accredited remedies, originally obtained from natural sources, have been made and have largely displaced them. A most conspicuous example of this is salicylic acid. It was predicted by Richardson in 1868 that: "Ere long we shall be able to manufacture in our laboratories drugs which will produce in the animal body any effect we might desire, without having to obtain them haphazard from various plants and other sources." The prediction has been echoed by Lauder Brunton, and to a certain extent has been fulfilled. We may expect in the near future to be in possession of synthetic remedies which will accomplish all of the effects observed in the physiological action of most of our drugs and which will have the advantage of a known chemical structure. It is to a chemist that we owe anesthetics. Sir Humphrey Davy knew nitrous oxide and chloroform and predicted their application for the relief of man, but clinical demonstration of their efficacy awaited the advent of an American dentist.

With the acceptance of the germ theory of disease and the successful application of what was first termed antiseptic but now aseptic treatment to surgical lesions, it was natural that treatment based on this principle should have been applied to diseases known to be of germ origin. It is unnecessary to dwell on this chapter in the evolution of therapeutics. While surgery has gained infinitely by the application of the principles of asepsis, and, by the observation of its demonstrated laws, has achieved results which are little less than astounding, internal medicine has gained little. Long before the germ theory of diseases was propounded it was known that quinine would cure malaria, mercury cure the pox, and salicylic acid certain forms of acute rheumatism. Since then little more has been accomplished than to demonstrate why accredited remedies are efficacious. But an enormous field of investigation was opened. The question of natural and acquired immunity was raised, and it cannot be said that the last word has yet been uttered on this subject. It was quickly recognized that it was not the germ itself which produced the phenomena of disease but its products. Brunton puts it clearly when he says: "Yeast does not produce intoxication. It is the alcoholic products of its action upon saccharine fluids which make a man drunk." It is necessary to study not only the seed but the soil, and it remains for future investigators to clearly show the relation of the one to the other. But most beneficent results have followed the prosecution of these studies. Behring's name shall be immortal for having discovered the antitoxin of diphtheria. In the comparatively few years of its use it has saved numberless lives and has given the physicians of the world a sense of security in the management of this dreaded disease which can hardly be expressed in words.

Alas for the hopes of humanity! but few infectious diseases have thus far been proven to be amenable to an antitoxin treatment. Serum treatment to-day is divided into three classes: first, the true antitoxins, efficient only in those diseases in which a toxin can be demonstrated to be present in the blood, and of which diphtheria, tetanus, botulism, and pyocyaneous infections are examples; secondly, bactericidal sera, which are capable of destroying the bacteria and which have been developed for typhoid, paratyphoid, colon bacillus, dysentery, plague, and cholera, and the success of which is still undetermined; and thirdly, a serum which contains neither an antitoxin nor a bactericidal agent, but a substance thought to be stimulating to cellular elements. Of this class are the sera of streptococcus, staphylococcus, pneumococcus, and tubercle bacillus, none of which have proven to be invariably curative. It would be interesting to elaborate this subject, but in this paper only results can be noted, and a full study of such a subject cannot be attempted. While the antitoxin of diphtheria has proven of much value and it is known that its curative power is greatest when it is used freely immediately upon the establishment of a diagnosis, the use of the antitetanic serum has been a disappointment. Ricketts of Chicago explains the failure by the fact that the toxin of tet-

anus is in such intimate association with the cell that it cannot be dissociated from the cell with the doses of the serum which can be used. At the same time he asserts that while it most frequently fails as a curative agent, its prophylactic power is very great, and he advocates its use in all lesions in which the development of tetanus would be considered as a possible result.

This leads naturally to the consideration of organotherapy. The use of the organs of animals and of man for the cure of disease is very old, though most of us associate such treatment with the demonstrations of Brown-Sequard. In the very earliest records of medicine the use of animal extracts or substances is recorded. Savages ate the hearts of the enemies whom they conquered that they might add courage to their own. Homer relates how the wise physician Cheiron trained Achilles on marrow to give him strength. The testes of the cock and of a well-fed dog, dried and mixed in wine, was said to be the favorite draught of the dissolute Roman youths and of Messalina, the notorious wife of Augustus Cæsar. The most remarkable account of the use of animal extracts is given in "The Natural History" by Pliny the younger. Thus he gave 286 observations on remedies derived from man, on 8 remedies from the elephant, 10 from the lion and the camel, 79 from the hyena, 19 from the crocodile, 15 from the chameleon, and 77 from the hippopotamus, to say nothing of those derived from domestic animals. The effect of all these substances was not due wholly to the imagination. Bence Jones isolated from the spider and its web, recommended for malaria by no less an authority than Thomas Watson, an albuminous substance which is the exact analogue of cinchona. It has been demonstrated that the secretion of the skin of a toad has an effect similar to digitalis, and, so, the old practice of prescribing preparations of the toad for dropsy had a rational basis. The "hell broth" of the witches in Macbeth, read carefully, is not unlike some of the ancient and accredited prescriptions. Since 1889, when Brown-Sequard revived the use of the testicular juice as the fountain of youth, and by his great name and his services to scientific medicine called the attention of the world of science to the possibility of the influence of the secretions of the various glands of the body in maintaining a state of physiological well-being, the study of the effect of these substances has been vigorously prosecuted, and some marvelous and valuable results have been obtained. Time does not permit even a review of these results. We can only observe that the latest Pharmacopœia recognizes preparations from the thyroid gland and from the suprarenal body, from the pancreas and from the stomach. The usefulness of preparations from the thyroid and from the suprarenal gland has been abundantly proven, and it is not beyond belief that other animal extracts will become equally valuable additions to our equipment. In demonstrated cases, as for example in cretinism and exophthalmos, it is clearly shown that the manifestations of abnormal conditions are due either to an absence of the secretion of this ductless gland or to an excess of such secretion. In the first case the cure is accomplished by the use of the active principles secreted by the gland, as in cretinism. In the other class of cases it has been proposed to antagonize the oversecretion of a hypertrophied gland by serum from an animal from which this gland has been removed, and in this way what is known as "antithyroidin" has been developed and has proven of value. More recently Rogers and Beebe have inoculated rabbits with the thyroid extract obtained from fatal or operative cases of exophthalmos, and have produced what they term a "cytotoxic" serum, which their experiments and Dr. Thompson's observations show is curative in some most extreme manifestations of the disease, cases which hitherto have never been known to recover.

Dr. John Beard, assistant professor of embryology in the University of Edinburgh, has propounded a theory concerning the etiology of cancer which is inviting the attention of fellow embryologists and of pathologists. Based on this theory his clinical coworkers have demonstrated that it is possible to destroy cancer *in situ* by the hypodermic use of sterile trypsin. In an interview with him this summer he said to me: "There is no question of our ability to kill cancer by this method. The only embarrassment is in getting rid of the products of destruction. Its success is more certain in cancers from which

there is natural or easily established drainage." He went over his clinical evidence which served to establish this assertion. If he and his coworkers shall establish the etiology and cure of cancer, his fame shall be no less secure than is that of Lister, Koch, and Behring; and he will have added the most conspicuous example of the therapeutic value of an organic product.

The past century has developed the use of electricity to an extent which beggars description. It has become our familiar servant in a hundred ways. Its uses in surgery and in medicine, both as a diagnostic agent and as a curative treatment, are too extensive for more than mere mention. The various currents and the mechanical contrivances for their successful use have been so augmented that the general practitioner can no longer use them expertly. Special training and an extended experience in observing its results are necessary to the electrotherapeutist. Its benefits are twofold—the actual results of electrochemical changes and the psychological effect upon the patient. What may be the future status of electricity in medicine is to me an insoluble problem. But that it represents one of the important advances in therapeutics is to-day hardly to be questioned.

The revival of massage and of mechanotherapy and the reëstablishment of hydrotherapy upon a scientific basis are outgrowths of the latter part of the past one hundred years, and the therapeutic value of each has been abundantly established. No intelligent physician can afford to ignore the helpfulness of each of these measures, but as with electricity, so much special training and special apparatus is desirable for their successful administration that such treatment must of necessity be relegated to those who elect to devote themselves to it as a specialty. But the principles of such treatment should be mastered by every physician, and such measures as can be carried out by the patient, and they are many, should be daily prescribed. In reviving physiological methods of treatment by climate, exercise, both active and passive, the use of baths, and attention to diet, we have gone back to the practice of the ancient Greeks, and may confidently expect to develop once more a race of men godlike in their physical perfection.

From the earliest days the influence of the mind upon the body, both as a cause and as a cure of functional disease, has been clearly recognized by all physicians. Galen said: "He cures most in whom most are confident." An active faith was the basis of cures in the temple of Asklepios, and the same faith in a god or a saint or a method or a remedy has left histories of miraculous cures that would more than fill a modern library. Every physician unconsciously uses this power every day of his life, and Heaven help the doctor who cannot secure greater results from his treatment by the creation in his patient of a faith that he will be cured than could follow the ordinary physiological action of any medicinal measures he prescribes. That employment of this means alone is the sole stock in trade of a multitude of so-called "healers" should not close our minds to its efficacy, nor should it prevent us from its exercise.

This leads to a final word on professional tolerance. Von Lessing said: "The search after truth is a greater gift of God to man than the possession of truth." In the pursuit of the science of medicine we are all searchers after truth and have a daily joy in seeking it wherever it may be found. In order to be able to judge correctly of the merits of any proposition it is conceded that the senses must be trained to observe accurately and the mind to reason logically, and that so much of the knowledge of the world as can be assimilated should be the possession of every educated person. It is also everywhere conceded that he who would take upon himself the responsibility of caring for the ills of humanity must be especially trained in all the fundamental sciences of medicine, including pathology and the natural history of all diseases. Every State in the Union has established a minimum of requirement which every one must attain before he can practice his art. There is no fear of evil results from him who pursues Truth and knows her when found. The past history of medicine, before the brilliant light of scientific truth illumined it, is shadowed with errors which were the result of theoretic propaganda. To substantiate a theory was considered of greater importance than to observe facts, and dogma ruled the past. Those days are past and gone forever. We have nothing to fear from him who qualifies himself for the prac-

tice of our art. We have everything to apprehend for the people from the possible recognition as practitioners of the healing art of those who are ignorant and uneducated. It is a mistaken notion of the people that the opposition of physicians to the admission of the various "paths" who are clamoring for legal recognition is from a purely selfish motive. The converse is true. If physicians were selfish and considered their own gains solely, they would actively urge the admission to practice of every Tom, Dick, or Harry who applied, for the practice of ignorant charlatans leaves a trail of woes behind that always and inevitably increases the revenue of the legitimate physicians.

It was a pleasure to hear Regent McKelway in his address at the centennial meeting of the Medical Society of the State of New York distinctly say that the only way by which the State could protect itself from incapable physicians was by maintaining its present high standards of preliminary and professional qualifications. If a man so qualified elects to practice exclusively any therapeutic specialty it would be his right, but an uneducated man, incapable of diagnosis, and ignorant of the knowledge of disease, should not be allowed to care for the sick at all. It is pleasing to observe that in accordance with that suggestion a bill has been introduced legislating out of existence the three separate boards of medical examiners and establishing in their place a single board whose duty it shall be to examine all candidates for the practice of medicine in all subjects save only therapeutics, the teaching of which is relegated to the recognized medical colleges of the State. Such a law must inevitably do more to eliminate medical dogma still existing than any measure that could be conceived, and it will just as evidently assure a higher quality of teaching of therapeutics in the medical colleges. It should receive the active support of every physician in the State. Medicine should be put upon the same common foundation as are law and pedagogy, and divorce itself from theology, in which field alone dogma still seems to hold its place.

The subject on which I have ventured is vast and of supreme importance. It has been impossible to do more than call attention to those phases of treatment which we, in this present moment of time, consider of the most importance. The progress of therapeutics has been very great, but it has been accomplished so laboriously and so quietly that it has lacked the dramatic element, and so has not compelled the attention of the public. If the past century had bequeathed to us only vaccination, anesthesia, and antitoxin, its three most valuable gifts, it would be distinguished above all similar periods of the past; but it has done even more. Let me close with Dr. Osler's estimation of the nineteenth century's progress in medicine: "Measure as we may the progress of the world—materially, in the advantages of steam, electricity, and other mechanical appliances; sociologically, in the great improvements in the conditions of life; intellectually, in the diffusion of education; morally, in a possibly higher standard of ethics—there is no one measure which can compare with the decrease of physical suffering in man, woman, and child when stricken by disease or accident. This is the one fact of supreme personal import to every one of us. This is the Promethean gift of the century to man."

ON THE USE AND ABUSE OF PULMONARY GYMNASTICS IN THE TREATMENT OF TUBERCULOSIS.

By Chas. L. Minor,
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In no profession is there a greater need than in medicine to guard, on the one hand, against the unreasoning acceptance of methods in general use without proper investigation, or, on the other, against adopting too quickly those based on attractive but ill-founded theories.

The swing of the pendulum of therapeutic practice is unceasing: on the one hand the tendency to follow the latest fashion is as evident as it is unfortunate; on the other the inertia that would unquestioningly accept without investigation old methods of practice, thus stopping all advance, is always at work, and is even more dangerous; hence the doctor must never forget the wise motto "prove everything." However cautious he should be not to be carried off his feet by admiration of the new just because it is new, and not because he has proven it true, an

occasional reëxamination of the old, of the theoretical and clinical bases of our former faith and practice, is unquestionably wise; hence when your chairman asked me to write on the use and abuse of pulmonary gymnastics in tuberculosis I gladly complied. Such gymnastics have formed a part of the treatment of the disease to a greater or less extent since the earlier times; they have been approved of by the majority of phthisiotherapeutists when carefully used, although since Cornet wrote in 1898 his work on Tuberculosis, in which he opposed them, some have followed in his lead.

Such gymnastics have not lacked for scientific foundation, the work of Waldenburg[1] and, more recently, of Le Grange,[2] Lazarus,[3] Campbell,[4] and Tissier[5] being very well known.

Let me here state that my own position regarding the matter is that in properly selected cases, and when properly used, such gymnastics are of great value, and that any doubt of their utility is founded upon the all too common abuse of them by those who have used them indiscriminately, thoughtlessly, and unintelligently.

In this country the most pronounced advocate of the views of Cornet has been Dr. Bridge, of Los Angeles, who has opposed their use as always harmful, and advocated in their place immobilization of the chest by adhesive or other bandages. In view of the publication of such beliefs it is desirable that we should consider the objections that have been raised, fairly and carefully, to see if the practice of the profession in this matter in the past has been wise and based on reasonable grounds, and since Dr. Bridge echoes the views of Cornet and goes considerably further than he in his opposition to gymnastics I will turn my attention to a consideration of the views on the matter which he has expressed in his book "Tuberculosis," published in 1903. These views I can express correctly as follows, using altogether his own words: "The wise and useful practice of the profession in treating all varieties of tuberculosis, except that of the lungs, has been to put the part at rest so far as possible. Just the opposite course has obtained in managing the lungs. The almost uniform practice has been, as soon as these organs become tuberculous, to urge the patient to take repeated deep breaths and 'expand the lungs.' . . . All these methods are harmful and wrong. There is no proof that the lung is an exception to the rule that tuberculous organs do best when perfectly quiescent; and there is much evidence to the contrary The diseased lung needs to be put at rest so far as it can be. . . . and no tuberculous lung should ever be allowed to expand and grow larger. Even cough should be suppressed whenever possible, in order to avoid the stretching and injury to the diseased tissues. One of the results of violence to an ulcer on the surface of the body is to increase the amount of scar tissue. . . . The tuberculous lung heals, if at all, with more or less new connective tissue around and in the midst of the diseased area. The process is presumably conservative, but if too much fibrosis occurs the contraction cripples the lung and may destroy life. . . . The great desideratum is to have as little fibrosis as possible consistent with cure. . . . There can be little doubt that, other things being equal, the amount of fibrosis bears some proportion to the measure of violence or motion to which the lung tissue has been subjected during the disease. If this is true, it is our duty to minimize or abolish the motion of the diseased lung."

These words, quoted verbatim, represent the views of Dr. Bridge. If these views are correct they would, of course, call for an entire giving up of all thoracic motion on the diseased side, including all bodily motion, as it has long since been scientifically proven that all muscular exertion increases and deepens respiratory motion. But I believe, on the contrary, that they are in conflict with reason and with clinical experience, which teaches not only that the thorax in tuberculosis tends to shrink as the case does badly and the trouble spreads, but that in all incipient cases it tends to reëxpand as the case improves, atelectatic areas open up again, and air reaches the lung more freely and fully. In advanced cases with much destruction of tissue, as they improve fibrosis occurs, and hence in such cases improvement is followed by a marked shrinkage, but as will be shown later such advanced cases are rarely if ever suitable for gym-

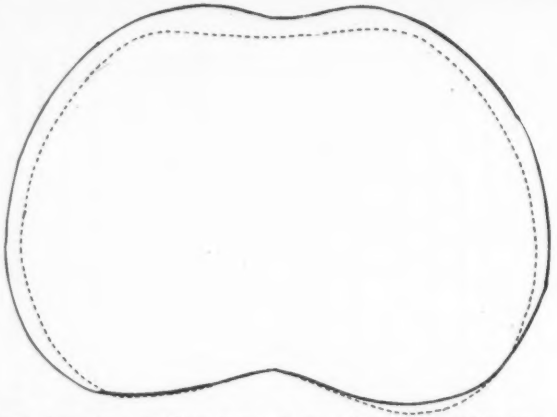
[1] Waldenburg: Pneumotische Behandlung.
[2] Le Grange: Medication par l'Exercise.
[3] Lazarus's Pneumatotherapie in Eulenberg Samml's Lehrbuch Allgn. Therap.
[4] Campbell: Resp. Gymnastics.
[5] Tissier article, Pulm. Gym.; Cohen's Handbook Phys. Therapeut.

nastics. It is, moreover, generally conceded that atelectatic or poorly functioning areas around tubercular foci are especially prone to fall a prey to the disease; hence gymnastics, which undeniably will remove or prevent such collapse of the alveoli, seem both rational and necessary. This opinion is not the result of general impressions, but of a careful study of lead-tape tracings and spirometric readings, as well as of records of the shrinkage and expansion of apical outlines and of fluoroscopic observations of this same shrinkage and reëxpansion, which I have taken systematically now for a number of years on many cases, at monthly or longer intervals, and which have given me the absolutely positive evidence of the correctness of the statement which I here make; and I am satisfied that any one taking the pains to make and record such findings will, whatever the preconceptions with which he starts, be convinced of the correctness of this view. I would refer to a few such tracings, which I exhibit. (All tracings are taken at level of a plane cutting junction of fourth rib and sternum in front and eighth dorsal spine behind. First six show coincidence of thoracic expansion with improvement of case. Second six show decrease of expansion in stationary or retrograding cases.) To anybody interested in the matter I can show large numbers of such tracing records in all varieties of cases. The favoring effect on the development of tuberculosis of occupations that narrow the thorax and limit respiratory motion, or of scars which bind the chest down, is universally recognized, the narrow, contracted chests of those prone to develop the disease are a matter of daily experience, and the beneficial effect on the health of such people of gymnastics which tend to expand the thorax need hardly be dwelt upon. It will scarcely be denied that it is wise in those with badly built chests, but not tubercular, to develop the thorax and lungs to their fullest, to decrease the likelihood of tuberculosis developing in them. If so it can scarcely be wise in a lung which contains a tubercular area of moderate extent to limit the motion of the enormously larger area of healthy tissue, to decrease its functioning by bandages or strapping, to favor rather than remove the peripheral atelectasis I have referred to, in order to immobilize as far as possible the diseased area. Further, if we have learned one thing as to tuberculosis it is that nourishment of the cell to strengthen it in its fight against the bacillus is essential (and I think we doctors too often forget that the oxygen of the air we breathe in and which is absorbed by the blood in the lungs is just as much nourishment or food as is the chyle in the intestines which is carried by the lymphatics to be emptied into the same blood current and fed to the same cells). Then why just at the time when the body most needs nourishment should we cut down hematosis, dam back carbon dioxide into the cells, and lessen oxygen intake?

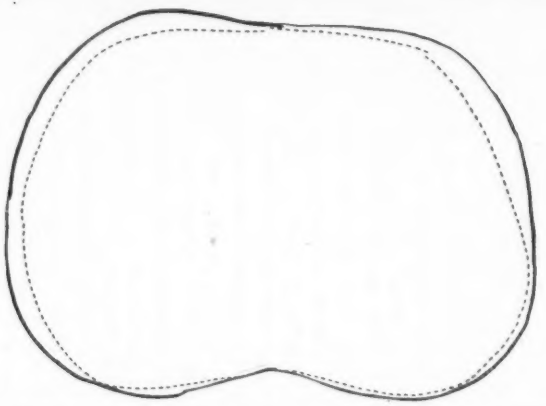
He who has watched tuberculous cases knows that returning health is marked by returning color in the pale cheeks, showing such an increased hematosis, by more erect shoulders, a more expanded chest, deeper breathing, increased vital capacity; and what doctor will believe that such a patient can possibly be injuring himself by a measure which tends to produce just such results?

If opening up an occluded nose which, as ample experience has shown me, can, by deepening breath and increasing oxygenation, be beneficial to the patient's general health, and nutrition, and color, why are not also gymnastics, which increase the amount of oxygen reaching the lungs and thence the cells, those final factors in a fight against the disease, reasonable and wise? As Robin[1] well says, "it is logical to think that the lessening of the area of hematosis is especially prejudicial to the consumptive in hastening that organic deterioration which is brought about by tuberculosis." Le Grange[2] notes that no organ modifies itself so rapidly as does the lung to accommodate itself to more or less heavy demands upon it. Tissier[3] in the same way dwells upon the fact that large amounts of lung tissue are only called into use when special demand is put upon the lung, and that by gymnastics we can call into play to reënforce the strength of the body much larger areas of lung than are generally employed. As I have already said, lead-tape tracings show conclusively that in incipient cases increase or decrease of thoracic perimeter goes uniformly with improvement or retrogression of the case, and to a less degree the same is true of

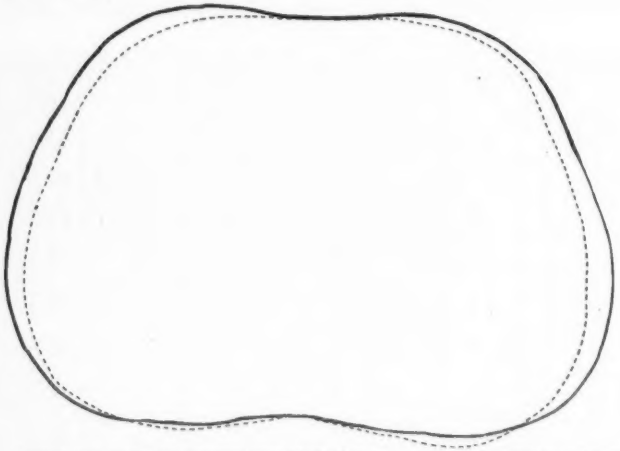
[1] Robin: Traite de Thérapeutique.
[2] *Loc. cit.*
[3] *Loc. cit.*



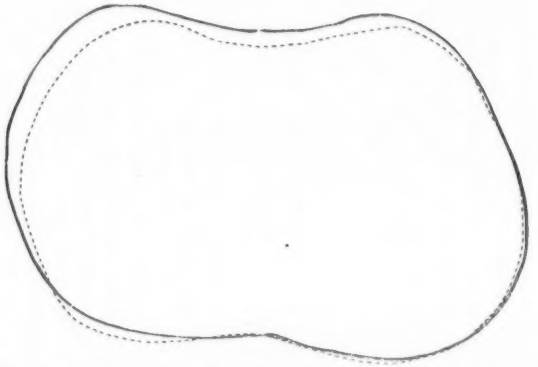
Dotted line shows condition March 28, 1906; black line, condition May 8, 1906. Expansion—gaining. Very incipient case, improving. Good effect of gymnastics well shown.



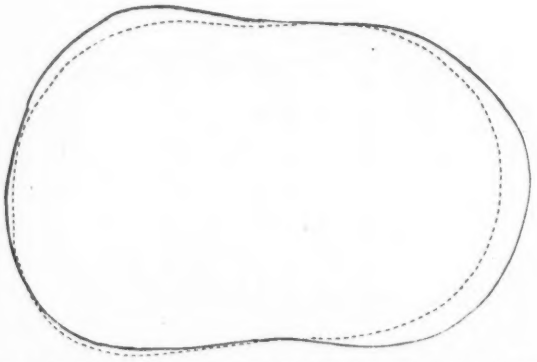
Dotted line, condition December, 1905; black line, February, 1906. Expansion of thorax with improvement of case. Slight right and left apex catarrh; doing well. Gymnastics used; v. c. gain 12 cubic inches (160-172); motion at bases gaining.



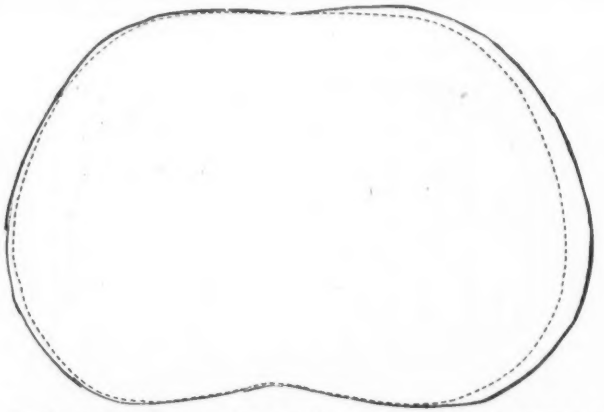
Dotted line, condition January, 1906; black line, March, 1906. Expansion and progress. Incipient case of moderate intensity (right upper one-third) going on to probable cure. Gymnastics used faithfully; gain in v. c. 10 cubic inches. Motion of right base increased ¼ inch; left base ¾ inch.



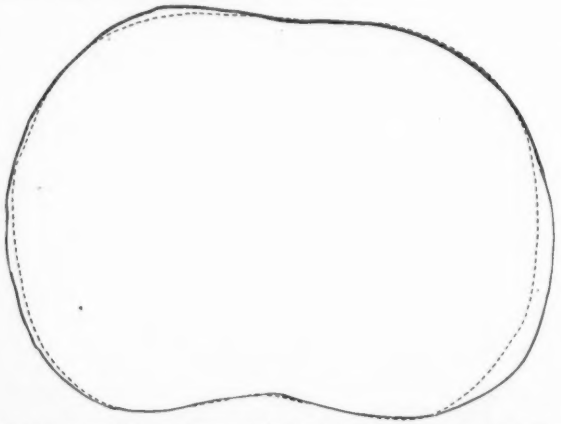
Dotted line, condition December, 1905; black line, April, 1906. Expansion and progress. Incipient case, right apex. Gymnastics freely; v. c. gained 14 cubic inches; slight gain motion at base.



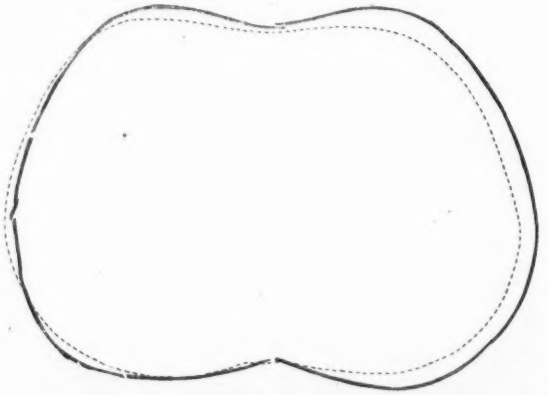
Dotted line, condition December, 1905; black line, May, 1906. Expansion and progress. Moderate bilateral process, especially right, making excellent gains; right side partly bound down by scar of extensive breast amputation. Deep breathing faithfully; v. c. not taken; motion both bases increasing.



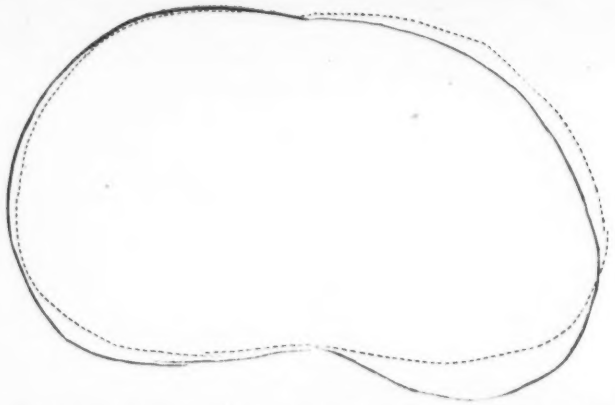
Dotted line, condition December, 1905; black line, March, 1906. Expansion and progress. Active case with bilateral involvement after left-sided pneumonia and nephritis. Great improvement; will probably recover. Gymnastics used, but spasmodically. Motion at both bases increasing.



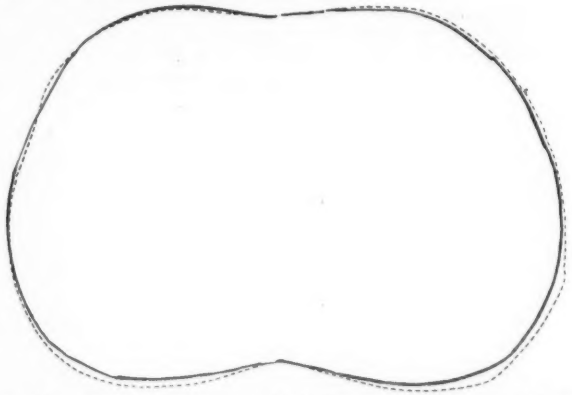
Dotted line, condition February, 1906; black line, May, 1906. No expansion materially; slight gain. Sluggish incipient case, right upper one-third; slow gains. Final outlook probably good. Gymnastics ordered, but intermittently used; no gain in v. c. (168). Motion, left base, increasing (½ inch); right base unchanged.



Dotted line, condition September, 1905; black line, April, 1906. Gain on bad side as it improved; slight loss on good side as it became involved. Originally, fairly extensive right process, now doing well; lately extension on left; progress sluggish; only slight gain of v. c., 5 cubic inches. Gymnastics were used, now stopped.

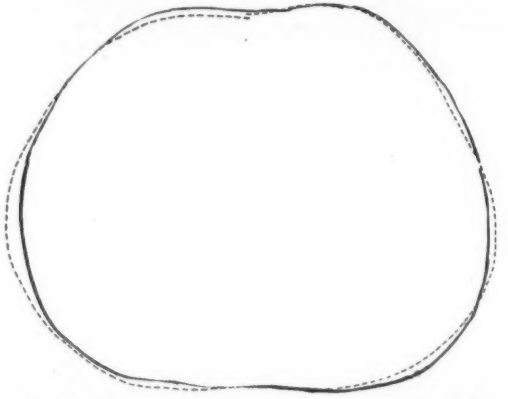


Dotted line, condition October, 1905; black line, April, 1906. Distortion of fibroid side, slight expansion good side. Chronic case, improving greatly after severe onset. Right side much fibrosis; retraction of right apex and base marked (right ¾, left 1¾). Only quiet, deep breathing used; slight signs on left; v. c. way below normal (92: 210), but gained 22 cubic inches as case improved.



Dotted line, condition January, 1906; black line, May, 1906. No material change. Extensive and slowly improving active process left upper half and apical involvement right. Patient slowly gaining, but still dubious prognosis. Motion of bases limited. No gymnastics; v. c. gained 12 cubic inches.

Dotted line, condition September, 1905; black line, May, 1906. Shrinkage. Old chronic ulcerative case, with some fibrosis; capable of amelioration, not of cure. Gymnastics contraindicated and never used.



Dotted line, condition October, 1905; black line, March, 1906. Slight contraction—clinically retrogression. Unfavorable bilateral case, spreading slowly. No gymnastics; v. c. not taken; no change in motion of bases.

vital capacity. Local shrinkages can and do indeed take place, chiefly over the apex, until or unless compensated by emphysema, or in the sternoclavicular angle, but the affected lung as a whole, and the unaffected lung also and earlier, undergoes very marked enlargement if the case is progressing favorably. All those who have watched such cases in localities of moderate or great altitudes have noted the enlargement of the thorax which the involuntary deep breathing and gymnastics produced by these altitudes bring about, and I believe will bear me out in the statement I have made that in incipient cases expansion means gain, general shrinkage loss.

In more advanced cases, and especially where there is cavity formation or much destruction of tissue, there is and necessarily must be shrinkage of the bad side, not primarily due, as the doctor implies, to fibrosis, but to caseous destruction of lung tissue which necessitates a falling in of the thorax to compensate for it, and which is accentuated later in favorable cases by fibrosis. Thus I think that Cornet's view that the diseased lung should be put at rest does not stand the test of clinical experience, and that it can only apply to lungs extensively infiltrated or considerably broken down, and that where, as is usual in favorable cases, a majority of healthy tissue exists it is bad practice to advise immobilization.

Again, Dr. Bridge dwells upon the harmful effect of violence to an ulcer causing more fibrosis.

The fibrosis that occurs in phthisis is the result of the reaction of a strong and combative organism against the tubercular poison, and is one of the very best evidences of that strength of constitution which will enable the cell to conquer. The weak cell, like the weak man, in the face of irritation degenerates, caseates, dies; the strong cell, like the strong man, is stimulated by the same irritation to further effort against its enemy, changes from a simple lymphoid cell to a connective tissue cell, and builds a wall of scar around the tubercle. This is fibrosis, and it is rarely if ever the harmful process the doctor would make out; in a small percentage of cases it favors bronchiectases and can be harmful, but in the vast majority it is a beneficial process, nature's own method of cure, and the clinician soon learns to welcome with pleasure every evidence of its commencement and progress. It is not primarily and chiefly caused by physical violence, but is the specific reaction of the cell to the tubercular poison, and the assumption that it is unduly increased by motion in the lung and that the amount of fibrosis bears some proportion to the measure of violence or motion to which the lung has been subjected during the disease would, I think, be most difficult to prove, and if proven would not make a valid objection to gymnastics, since fibrosis, as I have said, is so generally a beneficial process.

Thus it seems to me that both reason and clinical experience are against those who would discard gymnastics, and especially those who would substitute for them immobilization.

However, while I believe that this is the correct view, there is no question that pulmonary gymnastics both in medical circles, and especially outside them by physical healers and quacks, have been used irrationally and without a proper and careful selection of cases, and that as a result they have often done great harm. This, however, is true of every therapeutic measure; whatever the procedure some will always misunderstand its principles, ignore its contraindications, misapply its use. Every drug in the Pharmacopœia, every hygienic measure, has been and is being so abused, but this, which is an old and sadly justified complaint in our profession, demands not a giving up of useful though misused methods, but a careful study of their indications and contraindications, an understanding, as my title implies, of their use as well as their abuse.

Pulmonary gymnastics are such motions or exercises as tend to increase the size and improve the shape of the thorax and of the lungs within, and their final aim is to increase the resistance of the lung against the advance of the disease and to increase oxygen intake and carbonic acid output, effecting thus nutrition through the systemic as well as the pulmonary respiration and the circulation of the blood in the thorax, which, as Waldenburg[1] has long since shown, is powerfully affected by respiratory gymnastics. It should be noted that any bodily exer-

[1] *Loc. cit.*

cise produces the same effect as pulmonary gymnastics in a less degree, deepening and slowing breathing, increasing oxygen intake and carbonic acid output, as also does residence in altitudes, but I shall of course confine myself purely to pulmonary gymnastics, noting only that if in tuberculosis pulmonary motion ought to be cut down to its lowest possible figure, tuberculous cases must all be kept at absolute bodily rest flat on their backs at the lowest possible levels, as only thus can the minimum of lung motion be attained.

Pulmonary gymnastics can be classed as: I, Prophylactic; II, Curative.

I. PROPHYLACTIC.

(*a*) In childhood when on account of a bad heredity or for other reasons the maximum development of lung capacity is called for.

(*b*) In badly shaped chests, to restore or improve their shape.

(*c*) After sicknesses that tend to limit pulmonary capacity, as after pneumonias with slow resolution, or in pleurisy.

The prophylactic use of gymnastics I believe none will object to in either of its three subheads. Here it is that the family doctor can do so much and often does so little for the children under his care, by carefully inspecting their chests at yearly intervals and instituting such proper movements as will tend to correct the very frequent deformities of the thorax resulting from rickets, whooping-cough, and other causes. Every man who treats tuberculosis has had, I am sure, ample occasion to wish that this had been done to his patients while they were children and the thorax still soft and yielding. Again, in those with the habitus phthisicus or with badly built chests, but no signs of tuberculosis, their flat chests can be wonderfully deepened, the marks of past rickets to some degree removed, and vital capacity and expansion greatly increased; also after pleurisies and slowly resolving pneumonias they are universally recognized as invaluable in redeveloping the lung and decreasing the chance of the incidence of tuberculosis in the future. And here I may be pardoned for urging all medical men to familiarize themselves with the use of the lead tape cyrtometer, and the callipers, whose use is not difficult to learn, and which will greatly aid the eye in recognizing thoracic malformations and in showing increase or decrease of thoracic expansion.

II. CURATIVE.

Their curative use can be considered under the following heads:

First: (*a*) In florid phthisis and caseous pneumonias; (*b*) in acute miliary tuberculosis.

Second, in chronic cases: (*a*) As to stage of trouble: (1) In incipient cases; (2) in moderately advanced cases; (3) in advanced cases; (4) cases complicated by marked laryngeal or enteric lesions.

(*b*) As to physical lesions: (1) In localized lesions; (2) in disseminated lesions; (3) in cavitation; (4) in fibrosis; (5) in pleurisy.

(*c*) As to symptoms: (1) In afebrile cases; (2) in febrile cases; (3) in cases with profuse expectoration; (4) in hemorrhagic cases; (5) during inflammatory exacerbations or with spreading trouble.

In considering these various classes we can in the beginning exclude from the application of the method cases of florid phthisis, caseous pneumonias, and acute miliary tuberculosis, for all of which there is, unfortunately, no therapeutics save palliative efforts.

In the classification as to stages all advanced and complicated cases have to be excluded totally, even when afebrile, while in incipient cases, with practically no exceptions, unless they show a rapid onset, which bodes a very active course, gymnastics can be used with the greatest benefit. In *moderately advanced cases* we have to use great judgment in our selection. On the whole I would say that if the majority of the lung is free of involvement (or only small areas in two lungs) combined with a good temperature and satisfactory resisting powers, some of these cases will be greatly benefited, but a consideration of the other classifications will make this more plain. In incipient cases we have the largest number of suitable instances, the majority of such being greatly benefited by gymnastics.

Classification as to physical signs. In localized lesions which are inactive or but slightly active, by which I mean cases with but slight or no temperature (not over 99.4°), with none or only a few strictly localized dry adventitious sounds, we have the cases best suited to gym-

nastics, and in which they do the most good. When we have *disseminated lesions* we must be very careful that they are nearly inactive, the temperature normal, and the gymnastics begun very gradually by only quiet, deep breathing, but if carefully selected and closely watched we will find many of these cases which will be greatly benefited. In cavitation it is, with the single exception of a small, dry, or nearly inactive cavity, unwise, and always during the existence of any activity around the cavity, and especially, of course, in multiple cavitation, and I need hardly say that it would be utterly irrational to try to remove by gymnastics the localized thoracic flattenings we find over large cavities, especially, in my experience, beneath the second and third left ribs in front, such flattenings being the result of a conservative effort on the part of nature. *In fibrosis* where the chest is already greatly sunken and bound down it is evident that it is useless to try to stretch the bands of connective tissue which are responsible for the distortion, and it would be undesirable could we do so. When, however, we have a case showing localized fibroid changes I have succeeded in getting most useful and satisfactory compensatory development of the rest of the lung or of the other lung. *In pleurisy*, if adhesions are extensive and practically universal, gymnastics again, as in fibrosis, cannot remove them and should only be applied to obtain compensatory development in non-adherent parts of the lungs. If, however, pleurisy is very strictly localized and the large majority of the lung free I consider in the absence of any acuteness of the pleurisy that gymnastics are properly indicated, not to break up an adhesion and free the lung, though this has been advocated, but, as I have frequently insisted, to develop the other portions.

As to the *classification as to symptoms: Afebrile cases* are unfortunately by no means always incipient or localized, old and bad cases often being afebrile for long times together, and yet steadily going down-hill, and I have at this time under my care a case of extensive lesions with a very large cavity in the top of a universally involved left lung, and a smaller one in the top of the right lung, and also with intestinal involvement, and in which naturally the prognosis is utterly bad, yet the temperature is practically always normal or slightly subnormal; but as a general proposition I would say that the temperature should not in the afternoon go over 99.4°, and the pulse not be accelerated over 100, if any gymnastics are to be used. *Febrile cases,* especially if the temperature is 100° or over P.M., are to be entirely excluded, the increased oxygenation and tissue waste produced being here only harmful. *In cases with profuse secretion* it may be wisest to be very cautious, since it is possible, as has been claimed, that deep inspiration may tend to draw sputum into less involved areas, although this danger, which has often been suggested, has not yet passed the realm of theory. Of course any cases that have hemorrhagic tendency, and in all cases during inflammatory exacerbations, the "poussée de congestion" of the French, or in which the process is spreading, gymnastics are absolutely contraindicated.

Thus, to recapitulate the indications: Gymnastics are especially suited to incipient or only moderately advanced cases with localized or slightly disseminated inactive lesions, with temperature not over 99.4° and pulse not over 100, with or without tendency to shrinkage of the chest, narrowing of the shoulders, and stoop, or with small, inactive dry cavities or slight dry pleurisies. In these cases it will improve the thoracic form, reëxpand contracted but not yet involved areas of lung, increase vital capacity and hematosis, improve color index and nutrition, and increase the sense of well-being and strength and raise the vitality. On the other hand, advanced cases, or those with generally disseminated lesions, or with active or multiple cavitation, or with old advanced fibrosis, or with fever and rapid pulse or tendency to activity, should be entirely excluded. I would here note that as a general rule I use gymnastics in no case with numerous dry râles, and in none with moist râles or with even small areas of active bronchopneumonia.

Turning to methods, I would say that however useful special apparatus may be in the hands of their inventors, they are both too expensive to win general acceptance and have the great disadvantage of necessitating the patients coming daily to the doctor's office for special treatments;

so that I would exclude them from consideration. I have found that granted a patient thoroughly in earnest about getting well and willing to carefully and faithfully carry out orders, and a doctor who will attend to details, more satisfactory results can be obtained with practically no apparatus at all. The simple methods I would recommend I have tested carefully for many years, and by them have succeeded in reëxpanding contracted chests and increasing vital capacity and improving the pulmonary lesions, in a large majority of properly selected cases; and with such a careful selection I have yet to see any serious results, the instances in which I have caused temperature rise or increased symptoms having been few and never followed by serious bad effects. The procedures I would classify as (1) simple, quiet, deep breathing, with shoulders erect, sitting or standing; (2) forced deep breathing, aided by (*a*) arm-raising and lowering in a transverse vertical plane, inspiring as the arms rise, holding the breath when the hands are over the head, and expiring as they fall; (*b*) arm-moving in an anteroposterior horizontal plane, inspiring as the arms go backward, expiring as they come forward; or by (*c*) chest expansion by deep breathing with corner exercise, by which I mean placing the hands about two feet from the corner on two walls, falling inward with inspiration, pushing outward with expiration. In afebrile incipient cases, or as a prophylactic measure, there is no gymnastic I have found so valuable as the (*d*) "figure-of-eight" swinging of Indian clubs, inspiring as the small circle is made behind the shoulders, expiring as the arms come down in completing the large circle in front of the body. I would also say that with persistent and intelligent patients one can teach the localized use of one side of the chest while not materially deepening the breath on the other side, as has been well shown by LeGrange and Campbell, and that where it is desirable to especially expand one side unilateral gymnastics can accomplish excellent results.

Finally, while one's conviction of the utility of any medical procedure can only rightly come from faithfully made personal experience, and no report of the work of others should be enough to satisfy us of the value of a measure, I feel safe in asserting that those who will make a careful use of sensible and not too violent gymnastics in properly selected and closely watched cases of pulmonary tuberculosis, keeping tab on their results by the careful monthly use of lead tape, calipers, and spirometer, will convince themselves, as I have convinced myself, that the measure is capable of producing excellent results, that its use by the profession is entirely justified, and that we could ill afford to drop it from the list of our therapeutic measures in pulmonary tuberculosis.

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A RÉSUMÉ OF THE ORGANOTHERAPY OF EXOPHTHALMIC GOITRE.

By Hugo Erichsen, M.D., L.R.C.P. & S.

Although but a comparatively short time has elapsed since Moebius first brought his theory, anent the causation of Basedow's disease by a hypersecretion of the thyreoid gland, to the attention of the medical world, the literature on the subject has already become voluminous, as will be seen by a reference to the bibliography recently compiled by Professor Robert Bing, of Basle, and published in the *Centralblatt für die Gesammte Physiologie und Pathologie des Stoffwechsels mit Einschluss der Experimentellen Therapie.* It will be the author's endeavor to give an epitome of the practical results achieved, and to avoid, as far as possible, any extended reference to theories that are of but little importance to the general practitioner, no matter how interesting they may prove to scientific investigators.

Curiously enough, the correctness of Moebius's deductions was first confirmed by chance. A myxedematous patient of Beclere accidentally swallowed about 12 grammes of the thyreoid gland of a sheep. Immediately thereafter the pulse and temperature were temporarily increased above normal, but subsequently became normal and remained so. Moreover, in the following days a decided retrogression of the myxedema was also observed —psychic and facial changes, decrease in weight, and an increase in the quantity of

urine and its content of urea, phosphates, and chlorides.

Under the administration of large doses of the thyreoid gland substance there was a gradual decrease of the myxedematous symptoms, but when this treatment was unduly prolonged new evidences of disease took the place of the disappearing myxedematous manifestations. These were regarded by Beclere as evidences of thyreoidism, due to the excessive doses of the gland product. In addition to tachycardia, there were: fever, insomnia, excitement, polyuria, albuminuria, partial paraplegia, a feeling of heat, hyperhidrosis, and tachypnea. A tremor was also temporarily present.

Beclere, whose contribution to the literature of the subject Bing very properly characterizes as exceedingly important, called attention to the analogy between this artificial pathological condition and Graves's disease, but did not assert that it is complete. His experience was not only confirmed by clinical evidence, but by a large number of experiments on mammals. Among those who demonstrated conclusively that many of the symptoms of Morbus Basedowii can be produced artificially were Ballet, Enriquez, Lanz, and others. These experiments led to a conclusion that forms the basis for the serotherapy of Graves's disease, namely, that the human body normally produces a toxin that is neutralized by the secretion of the thyreoid gland. When this glandular function is gradually impaired, myxedema or cretinism results; if, on the other hand, it is greatly augmented, the excess of the thyreoid secretion becomes a poison and produces Basedow's disease.

In a communication to the *Münchener Medicinische Wochenschrift* (Jan. 27, 1903) Prof. Otto Lanz, M.D., then of the University Surgical Clinic at Amsterdam, lays claim to priority in the discovery of the serotherapy of exophthalmic goitre, and calls attention to the fact that he made some researches in this direction as early as 1894, and exhibited thyreoidectomized goats at the Third International Congress of Physiologists in 1895. But it appears that the researches of this gentleman were made simultaneously with those of Ballet and Enriquez. A note to that effect will be found in *La Semaine Médicale*, 1895, p. 330. At the Congress of French Neurologists, 1895, Ballet and Enriquez injected the serum of thyreoidectomized dogs into patients afflicted with Basedow's disease with very good results.

Before I take up the results obtained by means of this dog-serum, it might be well to state that the title of Moebius as the originator of the theory of the origin of Graves's disease has not been disputed. Even Lanz, who annihilates the claims of Burghardt and Blumenthal, refers to him as "the energetic pioneer of the thyreoid gland theory of Morbus Basedowii."

On the whole the results of the treatment with the serum of thyreoidectomized dogs proved rather disappointing, and it was therefore discontinued.

The suggestion of Lanz (*Corr.-Bl. f. Schweiz. Aerzte*, Bd. xxiv, No. 23, 1899) that the milk of thyreoidectomized animals might exert a therapeutic effect upon the toxin of Graves's disease constitutes an important episode in the organotherapy of exophthalmic goitre. He gave the preference to goats, as they most easily survived the removal of the gland and soon gave a liter of milk after the operation. In the publication above referred to Lanz reported three cases. One patient left the hospital two weeks after the treatment was begun with her pulse much improved and the goitre decreased in size; she also slept much better. In the second case decided improvement occurred after nine weeks' treatment. In the third the patient seemed decidedly better, though the treatment had been carried out for a week only.

In a later report (*Münchener Med. Wochenschr.*, Jan. 27, 1903) Professor Lanz made a more extended reference to Case 3, which was of an aggravated nature, complicated by some dementia. The author states that the patient had been much improved by the milk treatment when she was discharged from the Lindenhof Hospital at Berne. She was much stronger, could walk again, no longer had weeping spells, slept well, and insisted that her eyes had receded. A three-year-old milk-goat was thyreoidectomized and forwarded to her. After drinking the milk for about a year the patient presented herself again in the month of January, 1901, and stated that she considered herself entirely cured. The subjective symptoms no longer troubled her and the exophthalmos was much diminished, to such an extent in fact that the eyes could

be entirely closed. Only the goitre had not undergone any material change. The patient talked quickly and sensibly, looked well, and weighed 63 kilogrammes.

In his second paper Lanz reports three additional cases, in which very favorable results were secured. In one of these the almost complete disappearance of the goitre was a notable feature.

W. Goebel (*Münch. Med. Wochenschr.*, 1902, No. 20) assumed that the milk of thyreoidectomized animals does not contain any iodine in organic combination, and by the administration of this lacteal fluid aimed to prevent the production of an excess of iodothyrin and a consequent toxemia of the body. Goebel particularly recommended the milk on the score of economy, but considered it less potent than the Moebius serum, since it only represents a filtrate of the latter. Although a favorable result was obtained, Goebel's case is not conclusive, because he employed arsenic in addition to the milk.

Christensen (1903), Ballet-Enriquez (1903), and Stein (1905) also had recourse to the fresh milk of thyreoidectomized animals, with satisfactory results in every case. Burghardt and Blumenthal expressed their preference for Lanz's milk therapy over the Moebius serum treatment, because the former preserved the animal as a continual source of antitoxin and was just as effective.

An interesting case of Basedow's disease, in which the milk treatment advocated by Lanz was employed with excellent results, in this country, was reported by O. E. Lademann in *American Medicine* of November 19, 1904. The case was an unusually severe one, and surgical interference had proved out of the question. Therefore the author believed the result obtained was all the more remarkable. He expressed the conviction that the severer the disease the more milk is required to neutralize the toxin circulating in the economy in consequence of the thyreoid cachexia.

It occurred to Sorgo, in 1902, that the flesh of thyreoidectomized animals might be of service. Consequently he administered the powdered meat, but failed to obtain any therapeutic effect. Moebius (1903) was equally unsuccessful with the same product, thus discrediting it altogether.

Before I pass on to the consideration of antithyroidin, it may be well to make a brief reference to the so-called rodagen, a powder prepared from the milk of thyreoidectomized goats according to the method of Lanz. Moebius (1903) states that it is unquestionably effective, but does not seem to be as potent as the serum. But he considers it objectionable, because after a while it acquires a disagreeable smell and taste. The report of Reydel (1903) was particularly unfavorable. Kirnberger (1903), Fai (1904), and Kuhnemann (1904), on the other hand, commended the product. But, as Bing points out, the favorable experiences of these authors are not of importance, because the first named administered the rodagen in very small doses, in addition to other medication, and Fai and Kuhnemann conducted their investigations in climatic sanatoria that had a reputation for the cure of Basedow's disease. However, von Leyden (1904) commented favorably on the good results that had been obtained with rodagen in his clinic by Burghardt and Blumenthal. Bing explains the divergence of the clinical evidence in regard to rodagen by the limited keeping quality of the remedy, and strongly advises the employment of only fresh and relatively odorless powder.

At the suggestion of Dr. P. J. Moebius, a curative serum for the treatment of Basedow's disease was prepared from the blood of thyreoidectomized sheep and marketed under the name of antithyroidin in the spring of 1901. In the following October Moebius reported his experiences with the new serum to the Jena Convention of Neurologists. He referred more extensively to two of the cases presented on that occasion, in the *Münchener Medicinische Wochenschrift* of January 27, 1903, and arrived at the conclusion that the internal administration of the serum proved of benefit to the patients and did not produce any adverse after-effects. He doubted the possibility of effecting a cure. He attributed the horrible taste of the remedy to the carbolic acid it contained, and deprecated its high price, which practically rendered it

prohibitive, except in the case of the very rich.

The favorable results obtained by Moebius with this sheep serum were corroborated in the same year by Schultes, Adam, and Rosenfeld. Of these reports, that of Schultes (*Münch. Med. Wochenschr.*, 1902, No. 20) is by far the most important, because in his case the factor of suggestion was entirely excluded, the therapeutic effect of the serum being exerted at a time when the patient was completely demented. The case is also particularly instructive because the circumference of the neck and the pulse-rate increased after the administration of the serum had been discontinued, and an improvement promptly took place when the treatment was resumed. Moreover, nothing but the serum, given in sherry or raspberry juice, was employed as a remedy. Favorable results with antithyroidin were also obtained by many other European investigators.

In our own country an interesting report of a case of exophthalmic goitre that was treated with a thyreoidectomized goat serum, prepared by Parke, Davis & Co., was published in the *Boston Medical and Surgical Journal* (vol. 152, p. 492) in 1905 by James M. Jackson. The goitre involved both lobes and the isthmus, and the exophthalmos was marked. Four months after the beginning of treatment the patient was practically well, the goitre and exophthalmos had nearly disappeared, the tremor and perspiration were very slight, and the pulse-rate had been reduced to 100 or a little under. The patient was able to return to work and expressed the greatest satisfaction at the result of her treatment.

At a joint meeting of the Chicago Neurological and Chicago Medical Societies, held March 29, 1905, Dr. Sydney Kuh reported eleven cases of exophthalmic goitre that had been treated with the serum of a thyreoidectomized animal. Among the eleven there was one in which the effect of the treatment was temporary only, and another in which there was no effect at all; in the remaining cases the improvement was very pronounced. Dr. Charles L. Mix also reported his experience with the serum in two severe cases of Graves's disease. In both of these cases the condition of the patient was materially improved. Kuh referred to the serum treatment as an excellent palliative, and expressed a doubt whether the improvement would be permanent unless the treatment is resumed from time to time. Mix spoke of it as affording great possibilities.

The latest phase assumed by the organotherapy of Graves's disease dates from a suggestion made by Hallion at the Brussels Medical Congress in 1903. He proposed the internal administration of a sanguineous extract made as follows: The blood of a sheep that had been thyreoidectomized for several weeks was added to equal parts of glycerin. After it had been allowed to macerate for several days, being thoroughly shaken several times during this period, it was filtered through paper, under aseptic precautions. However, no bacteria are likely to appear, on account of the glycerin. The finished product is bottled, like wine, and is said to keep very well.

Ballet, Enriquez, Sainton, Breton, Carrion, Pisante, Rigoulet, and Hallion tested the new preparation therapeutically and reported their experiences in the course of 1904-1905. The results obtained were similar to those produced by the administration of antithyroidin. In one of the cases reported by Sainton and Pisante (*Revue Neurologique*, Dec. 1, 1905) a relapse occurred when treatment was suspended, but there was a continuance of the improvement when it was resumed.

A very interesting report of an aggravated case of exophthalmic goitre that was successfully treated with thyreoidectin (a reddish-brown powder prepared from the blood of thyreoidectomized animals) by Dr. Emil Ries, of Chicago, appeared in the *Illinois Medical Journal* for March, 1906. In January, 1905, the patient was brought to the doctor from a distant town, on a stretcher. She was unable to walk any distance. She was greatly emaciated. She had exophthalmos and Graefe's sign, a pulse of 112 to 120, and a goitre. She was salivated; she vomited; she looked sallow, and she was sent to Dr. Ries for operation. The patient weighed at that time seventy-three pounds. She was put on thyreoidectin, which only a short time before had been recommended, and which is the dried

blood of the thyreoidectomized goat or sheep. She took as much as she could. She was put to bed and took the thyreoidectin for nearly a month. During the first month under thyreoidectin she gained twelve pounds. Her pulse went down to about 96. The salivation disappeared completely. Her color improved somewhat, although the goitre did not shrink very much. Exophthalmos was slightly less, but her general condition improved considerably. She could take food.

In conclusion the doctor says: "The patient continued to take thyreoidectin off and on until September of last year, but since then she has not had any. She now weighs 141 pounds, a gain of almost seventy pounds. She has received no other medication except this. Her pulse, when I examined her two days ago, was 120. The goitre has shrunk considerably, and the exophthalmos is not at all marked now. She can eat, as you may gather from the fact that she has gained seventy pounds. She does not vomit any more. She is not salivated. Menstruation had been absent for a considerable time before she came to me, and she did not menstruate until some time in the summer of 1905. But for the last three months she has menstruated regularly without any local treatment. The most important feature is the remarkable improvement in the patient's general condition. I simply show this case as an example of what thyreoidectin may do."

Thyreoidectin is readily soluble in water, non-toxic, does not produce gastric irritation, and is rapidly absorbed from the stomach. It is put up in 5-grain capsules, which are given by the mouth, the dose being gradually increased from 15 to 60 grains a day, the 60-grain daily portion being divided into three doses.

Lately efforts have been made to produce an antithyroid serum, but the results have thus far proved far less satisfactory than they promised to be. According to Bing the immunization of large herbivora (such as horses) for the purpose is a tedious and complicated process that would probably never be of practical importance, even if the therapeutic effects should prove more uniform than those hitherto obtained.

CHRONIC TUBERCULAR JOINTS: THEIR DIAGNOSIS AND TREATMENT.[1]

By J. Torrance Rugh, A.B., M.D.,
Demonstrator of Orthopedic Surgery in the Jefferson Medical College; Orthopedic Surgeon to the Methodist Hospital, etc.

To the mind of the general practitioner of medicine, tuberculosis of a joint presents a rare condition which is seen chiefly in the dispensaries of our large hospitals, and is scarcely to be reckoned with in the every-day practice of the busy doctor. If each physician could see the dire and irremediable results which so frequently and almost invariably follow the failure to recognize the condition in the early onset, he would appreciate more fully the importance of this form of infection and its capacity for causing deformity and disability of the worst kind. The saying "once tubercular, always tubercular" has much of truth in it, as it is manifestly impossible to say when the lesion has been eradicated, and many varying factors may singly or together cause a relighting of the original process, years after activity has ceased.

In every recognized disease there is a symptom-complex which serves to distinguish it from others, and in no condition is the group of characteristic symptoms found more constant than in tuberculosis. The process is, pathologically, the same wherever found, and the diagnostic signs are likewise the same no matter where the location of the lesion. To the consideration of these characteristics attention will now be directed.

Childhood is the age of election for tuberculosis of joints, more than 75 per cent of all cases occurring before the fifteenth year. Instances have been reported, however, in which the patient was past seventy years of age, so that the possibility of its primary occurrence at any age must always be borne in mind.

Of the sexes, males are slightly more frequently affected than females; probably due to the more active life led by that sex and consequent greater liability to injuries.

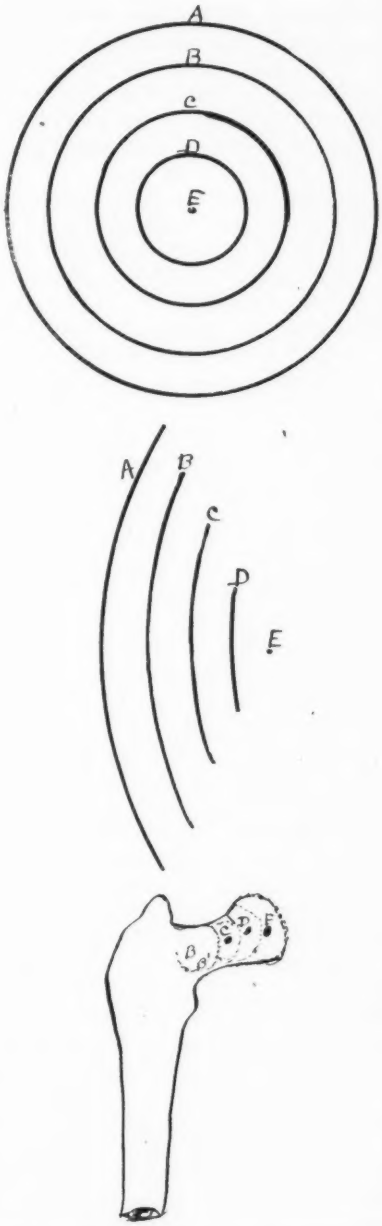
In the etiology, a hereditary history is

[1]Read before the Camden City Medical Society, February 6, 1906.

obtainable in about 70 per cent of cases, and is of only relative importance in the diagnosis. Of much greater import is the history of a slight injury received some days or weeks previous to the onset of the symptoms. Stress is laid upon the slight character of the traumatism, as in this condition the resulting inflammation is not of sufficient intensity to resist the bacterial invasion, while in the more severe cases the protecting wall of leucocytes easily restrains the bacilli from establishing their characteristic infection. The injury received is of such minor importance and character that the patient is not disabled for more than twenty-four hours, if even at all, but after the lapse of a few days or a week slight stiffness of an intermittent character is noted in the joint, giving rise to some restraint in the movement of the part.

The development of the inflammatory action is insidious and slow, a week or more being necessary for the definition of those symptoms which will either cause the patient to seek medical advice or render the performance of daily duties impossible. At this stage of the disease the fact must be emphasized that the lesion is monarticular, and that it remains so for a long period of time or for all time. If perchance a second focus appears in another joint, it is much more likely to occur in one remote from the original joint and in no way related to it, rather than in the corresponding joint. In this respect it differs from rheumatism, which is almost always polyarticular and affects analogous joints. Furthermore, rheumatism in children is a not very frequent disease, but when so met it always presents an acuteness never observed in tuberculosis.

The intermittent stiffness in the joint soon becomes constant, and then interferes with the function to the extent of causing its entire loss. The location of the focus of disease may be easily determined by observing the amount of function remaining, as the relation existing between the two is a constant one, viz., the nearer to the articular surface the lesion is located, the greater will be the interference with function, while the more remote the lesion the less will function be disturbed. This can be diagrammatically represented in the following manner:



The circle or line A will represent the normal motion of the joint. If, however, a tubercular focus exists at B and the area of inflammation extends to the dotted circle B^1, the amount of motion will be limited to the circle or line B. As the area of inflammation or the focus of disease approaches the articular surface the function becomes restricted to the circles or lines C and D, and finally when the

process reaches and involves the joint surfaces, the function becomes *nil* and is represented by the point E. It therefore becomes possible to locate the focus of disease so that if necessity demands it may be reached surgically with comparative ease.

Coincident with the loss of function and acting as the causative factor, the muscles will be found in a state of rigidity. This muscle spasm is reflexly due to the inflammation in the joint, and is nature's effort to prevent progress of the disease and destruction of the articulation by inhibiting motion, which is the greatest factor in the spread of a tubercular process. Pain is not a marked symptom in the great majority of cases and is intermittent in character. It is not severe, and is more likely to be worse at night. When the spine or hip is the part affected, the pain is more frequently referred to the periphery of the nerves which are in closest relation to the area of disease. When a child complains of constant pain in the stomach and does not improve after a few days' treatment of the gastrointestinal tract, the spine should be carefully examined for evidences of incipient caries; or better still, the spine should be examined first and before any treatment is instituted. Also, pain in the knee or inner thigh should direct the physician's attention to the hip-joint as the possible seat of the tubercular focus. If, however, in a given case, pain has been marked and has increased in spite of all remedial measures employed, distention of the joint capsule and rapid breaking down of tissue should be suspected, and if the pain suddenly ceases and swelling appears this condition with rupture of the capsule becomes a certainty. When the affected joint is a superficial one, localized tenderness on pressure becomes one of the most important symptoms. Senn, in his admirable work on "Tuberculosis of Bones and Joints," gives it as a diagnostic feature which is almost pathognomonic. In all other joint conditions the tenderness is diffused over large areas or involves the entire joint, but in the tubercular joint, even though the process be universal, the tenderness will be found located at one or two spots which can be covered by the finger end. If these spots are opened early in the onset of the disease, the entire focus may ofttimes be removed and further involvement of the part be prevented. Swelling is another symptom which is also noted early, and is due, first, to the proliferation of tissue, the result of the bacillary action, and later to softening and necrosis of this tissue, which becomes caseous and then liquefies. There is also bony enlargement from the same cause, and though the process may be ultimately cured, the thickening is permanent. When the inflammation involves the synovial membrane, hydrops of the joint is very likely to be present, especially if the synovial lesion is primary. This joint enlargement is rendered more pronounced by the state of the muscles which supervenes early in these cases, viz., atrophy. This condition is a most profound one, and in degree is surpassed only by that of anterior poliomyelitis or infantile paralysis. It is due to three causes: (*a*) disuse of the part because of the disability; (*b*) atrophic disturbances from the action of the toxins on the nerve trunks and trophic cells in the cord; and (*c*) the most potent of all factors, the overuse of the muscles, consequent upon the state of spasm which exists and prevents a proper supply of nutriment. While the atrophy in most other conditions may be overcome by treatment, in this one it is permanent and uninfluenced by any method of treatment known to medicine. The combination of these two symptoms, swelling of the joint and atrophy of the muscles, gives rise to the term "spindle-joint," which is so widely identified with this form of infection.

The temperature in these cases is slightly elevated, running from 99.5° to 101°, and never above unless there has occurred a mixed infection by the pyogenic organisms. Even though a large abscess be present, fever is absent when the infection is purely tubercular. This fact becomes more apparent when it is remembered that the contents of the abscess is not pus, but is merely the liquefied granulation and connective tissue, the breaking down of the so-called "white swelling" in the diseased area, and is distinctly a cold abscess unless inoculated with pus germs. However, this pus is extremely virulent, and when injected into susceptible animals will produce typical tuberculosis, though bacilli are rarely found in it.

In the interests of the patient the writer cannot refrain from condemning the practice recommended by some of our works on surgery in the examination of a joint for evidences of tuberculosis, which consists in jarring the part by a sudden blow upon it or upon the parts in relation with it. Pain elicited by this method indicates inflammation in the part and nothing more. Muscular rigidity, shown in characteristic posture, movements, etc., indicates the presence of inflammation just as unmistakably, and the search for this sign does not subject the patient to the fearful danger of increased injury to the joint, breaking down of the carious area, and the possible irreparable deformity quickly ensuing. The protest against any method of examination involving force, however lightly or carefully it may be applied, cannot be couched in too strong terms.

Anesthesia is likewise unnecessary in the diagnosis of tubercular joint lesions. Some physicians and surgeons are of the opinion that muscular rigidity persists in a tubercular joint under anesthesia, but the fact is that no matter what the cause or origin of the muscular spasm may be, relaxation takes place under anesthesia, and in the later stage of the disease the symptoms of tuberculosis are so marked and so typical that anesthesia for diagnostic purposes is superfluous and may prove harmful.

The clinical picture of tuberculosis in a joint is, then, (*a*) a slight trauma (*b*) in childhood, which is followed by the (*c*) chronic onset of (*d*) impaired function, due to (*e*) muscular rigidity which is complete and rapidly induces (*f*) marked atrophy, which renders the (*g*) swelling of the joint more prominent; (*h*) intermittent pain, at times referred along the nerves, exists together with (*i*) localized tenderness on pressure and (*j*) a slight elevation of temperature. It is simulated by but one variety of infection, viz., syphilis, and from this it is differentiated by the history and age of the patient, congenital syphilis seldom primarily affecting the joints and usually presenting other symptoms of its presence.

Rheumatism is the disease for which it is most frequently mistaken, and unjustifiably so, as the two have practically nothing in common excepting location. In children rheumatism is uncommon and involves analogous joints when present. There have been reported cases of monarticular rheumatism, but at some time in the course of the disease in these cases other joints have been more or less affected, the condition finally confining itself to one part. Muscular atrophy is not present to any marked degree, the symptoms are acute, and recovery takes place in two or three weeks' time. The chief cause of error on the part of the great majority of physicians is the failure to strip the patient and examine the part carefully. If this were done there would be scarcely a possibility of a mistake, and even though the picture were indistinct and incomplete, a few days' observation and careful reëxamination would remove all doubt.

Another very common scapegoat employed by physicians is "growing pains." That such may exist is probably true, but they occur much less frequently than is popularly supposed. It is hard to believe that growing is a painful process. The best explanation of their etiology considers them due to a temporary hyperemia in the epiphyses of the long bones, occasioned by the very rapid growth of the patient and too violent work or exercise. They are evanescent, and a few days will suffice to dispel them and so to remove any possibility of confusion.

The acute infections differentiate themselves from tuberculosis, which is essentially chronic and lacks the symptoms of a severe infection. One condition, however, deserves consideration in passing, as it is so frequently met with in these modern days of excitable children and adults. Boys having a long or adherent prepuce and girls with adhesions between the hood and clitoris frequently present disturbances of function in one or other hip with more or less pain and "night-cries." When such cases are encountered the features to be noted are the extreme restlessness, the nervous temperament, the wandering character of the pain (the one hip being affected to-day and the other to-morrow), and the evidences of sensitiveness in the genitalia. Absolute differentiation is secured by relieving the adhesions and noting the results.

The treatment of tubercular joints naturally divides itself into non-operative and operative. The non-operative, which

is usually the first to be employed, consists in rest to and fixation of the part, and when efficiently applied recourse to operative measures will be rendered unnecessary. At the earliest onset of the symptoms of the trouble the joint must be fixed by splint, plaster, or brace, and all function absolutely prohibited. If the muscular spasm is marked and pain is complained of, extension should, when possible, be employed to overcome these conditions and to lessen the inflammation. When this purpose has been achieved fixation must still be maintained and the part protected against injury for a period of one to three years, according to the severity of the symptoms. The resumption of use of the part prior to this time is dangerous, as the necessary traumatism of attempted function may relight the process and endanger the integrity of the joint. There is a popular idea that the prolonged fixation of a joint will necessarily be followed by ankylosis, but in a non-inflammatory case such is impossible, and in a tubercular one, by restraining motion, inflammation is lessened, and with the lessening of the inflammation the danger of ankylosis is much diminished. Hence the earlier fixation is secured the less marked will be the inflammatory reaction, and therefore the less will be the danger of ankylosis. If ankylosis has occurred, no attempt should be made to break it up or to restore motion. The original process will almost certainly be relighted by such treatment. If a slight amount of function is preserved, the increase of such function should be left to nature and the patient, with the almost certain assurance that neither will do aught to endanger the cure of the process, and yet both will ultimately secure the best results obtainable. "Once tubercular, always tubercular" must not be forgotten, as it constantly warns against the dangers of injudicious interference. Some years ago the writer personally had charge of a case in which a tubercular process had remained latent in a joint for sixty years, and then under favorable circumstances became active.

Of the local remedies, probably none is superior to ichthyol, and yet it is doubtful if even that is of any material value. Such applications are palliative and satisfy the patient that something is being done, and in the meanwhile the principal remedies, viz., rest and fixation with out-of-door life and good food, will have produced the desired effects.

The operative treatment of tubercular joints may be curative or palliative, radical or conservative. In the early progress of the disease the entire focus may be excised and the patient cured by such procedure, though dissemination of the tubercular process is more likely to follow operative than other forms of treatment, which fact renders radical measures preferable at this period of the disease. In the later stages radical means should give way to conservative, as the long continuance of the disease will have extensively involved the part, and radical measures will be found incompatible with the preservation of parts, as nothing short of amputation will at once remove all the diseased area. Fortunately, however, nature has shown herself a good physician, and when assisted by the surgeon will ofttimes remove, absorb, or encapsulate those portions of diseased tissue which cannot be removed by operation.

If ankylosis has resulted with the bones in a deformed relation, resection of the joint may be performed and the parts placed in the best position and so maintained. This maintenance should cover a period of at least two years, and perhaps longer, as the union which obtains between the ends of long bones or between the epiphyses is first fibrous and only after two or more years becomes bony, and until bony union is more or less complete contraction and change of position are liable to occur. If resection is not feasible, an osteotomy may be done near the joint and the deformity overcome. Some of our European confrères are more venturesome than we and do the osteotomy through the diseased area, if that position will secure better or more satisfactory straightening. Where the operation is performed in the shaft of the bone, the time of fixation is much shorter than before mentioned, as six to eight weeks only are required for the firm bony ankylosis in this part.

Injection of the joints with various drugs has been exploited from time to time, but has been abandoned after a time as only a temporary measure. Among the drugs so used have been hydrochloric acid, iodoform, zinc chloride, carbolic

acid, and tincture of iodine, and even the actual cautery has been used to destroy the diseased focus. Passive congestion by means of bandages above the affected part (Bier's method) is advocated by some surgeons, especially the European, and the active congestion by hot air, applied with the joint in a partial vacuum, is likewise used, but neither form has been extensively adopted in this country.

The constitutional treatment must not be neglected, as the same physical condition is to be desired here as in all tubercular conditions. Fresh air, sunlight, and plenty of good food are the best combative agents we possess. Guaiacol or some similar drug is ofttimes beneficial by improving the digestion and assisting in assimilation of the food. Tonics may be used as indicated, but not in a routine manner.

REPORT OF A CASE IN WHICH DISAGREEABLE SYMPTOMS FOLLOWED THE LOCAL USE OF COCAINE, ADRENALIN CHLORIDE, AND ARGYROL.[1]

By W. G. B. Harland, M.D.,

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A lady, under middle age, whom I have treated off and on for years for a lithemic condition of the throat and nose, came to me March 23 to have some nasal pressure symptoms relieved. She came direct from her dentist, who had just given her teeth a thorough cleaning, using besides mechanical agents a few drops of a carbolic solution, and nothing else. I began by spraying the nose with an alkaline solution, and applied a few drops of 4-per-cent cocaine and 1-to-1000 adrenalin chloride to the lower turbinates, using very little of these medicines. I then touched the turbinates at several points with glycerite of tannic acid and applied argyrol, 25-per-cent, through the nose to the rhinopharynx. Treatment was completed with the menthol-albolene nebula. I had often used this mode of treatment on this patient for relief of disagreeable symptoms, depending for cure upon hygienic and dietetic measures. I had just finished the treatment outlined above when the patient said she felt as though she were getting the worst cold she ever had. Her nose, which had opened up, became tightly blocked, her throat felt hot and dry. There was fulness and roaring in the ears, but no deafness nor dizziness. She experienced a sense of heat and fulness about the head, and her eyes became suffused like those of a person crying violently. The skin of her face and hands became markedly reddened and somewhat swollen. About twenty minutes from the beginning of the attack the patient complained of itching about the head, which progressed downward, ceasing above as it spread below. The patient could walk, hear, and speak without any trouble, nor did she feel faint, and although anxious she preserved her self-control admirably. The pupils were dilated somewhat, but accommodation was preserved throughout; the pulse was slightly rapid and weak. Although the symptoms were alarming to the patient, at no time was her condition serious. After forty minutes the symptoms abated, and twenty minutes later the patient did not hesitate to walk out of the office alone. She felt a little out of sorts the rest of the day, but was entirely well next morning. The only treatment was strychnine sulphate gr. 1/30. It might be well to state that the patient has a marked idiosyncrasy for quinine, and has an eczematous condition supposed to be due to uric acid.

A more pronounced case of this kind was reported by Burnett (International Clinics, 1902) following the use of a 1-to-1000 solution of adrenalin chloride in a nasal spray, and other laryngologists have had experiences similar to mine. Why the treatment should have affected my patient disagreeably on this occasion only after having always before produced most satisfactory results I cannot understand; the medicines had been used on others before she came, and I took particular pains to study their effects at the hospital clinic that afternoon, using the adrenalin on many patients with absolutely no untoward effect. Some more susceptible condition of her general condition can alone explain the result. At first glance the symptoms suggested belladonna poisoning, but a differentiation was readily made, and I at no time

[1] Read before the Section on Otology of the College of Physicians of Philadelphia, April 18, 1906.

felt any alarm about the outcome of the case.

There has never been a fatal case of poisoning from adrenalin chloride as far as I know, and as the use of the medicine is attended with no risk of forming a habit it is by far the safest remedy we have at our command in the treatment of inflammation of the nasal mucous membrane. A report of this kind may be of value in reassuring others who may happen upon a case exhibiting an idiosyncrasy for adrenalin.

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*IODOPHILIA: A PATHOLOGICAL AND CLINICAL STUDY OF THE IODINE REACTION IN ONE HUNDRED CASES.**

By John C. Da Costa, Jr.,
Philadelphia.
From the Laboratory of Clinical Medicine and Therapeutics of the Jefferson Medical College Hospital.]

PRELIMINARY CONSIDERATIONS.

If a dry specimen of normal blood be treated with a weak solution of iodine, the stroma of the erythrocytes and the protoplasm of the leucocytes stain a pale lemon-yellow tint, and the nuclei of the latter cells remain practically colorless, or at the most show delicate refractile points and shadows corresponding to the twists and the knots of the chromatin network. In numerous pathologic conditions, however, the protoplasm of the leucocytes, especially those of the neutrophile type, when exposed to iodine, exhibits a peculiar susceptibility to the action of the metal, and stains a variable shade of brown. Such cells are known as iodophiles, and the reaction as iodophilia.

In addition to the iodine-stained cells one frequently finds in normal blood small numbers of irregularly shaped plasma masses which react to the reagent and stain a deep mahogany color. These extracellular masses may be either free in the plasma, or, as is more often the case, incorporated with bits of cytoplasm derived from leucocytes which have been traumatically fragmented or disintegrated. No definite significance can be attributed to this form of extracellular iodophilia; it may be wholly wanting in blood teeming with cellular iodophiles. In cases in which both the intracellular and the extracellular reactions develop—a finding occasionally observed—it is possible that the latter may be taken as a sort of index to the vulnerability of the leucocytes. There is also good reason to believe that some of these free iodine-stained masses are the remnants of blood plaques, while still others are plainly artefacts.

It will be noted that the foregoing descriptions apply solely to the dried blood specimen, a point which must be emphasized, in view of the fact that a fresh moist film of perfectly normal blood, exposed to iodine vapor before it has had time to dry, shows a precisely similar change. This, as Wolff has pointed out, means that the iodophilous substance, presumably glycogen, is normally present in the circulating leucocytes, although, as I shall attempt to explain subsequently, it is not demonstrable in the dried film prepared in the ordinary manner, owing to its excessive solubility. The presence of iodophilia in the dried film, then, is pathologic, for in the normal dried specimen the reaction is consistently negative. Unless otherwise stated, the reactions detailed in this report invariably relate to dried spreads, and not to the so-called "vital iodine-fixation" technique.

NATURE OF THE REACTION.

Ehrlich's original opinion,[2] that the iodine reaction betrays the presence of cellular glycogen, is generally credited at the present time, though in the past this has been disputed by several investigators, notably by Czerny,[3] who maintains that the material responds to tests for amyloid, as a form of which he regards it. Goldberger and Weiss[4] believe that peptone is responsible for the change. Personally, I have never been able to find the slightest trace of the amyloid blue in specimens treated with iodine and sulphuric acid, nor to develop a pink or rose color in films fixed in absolute alcohol, stained with methyl-violet, and decolorized with dilute acetic acid. This, however, may mean nothing, for technical methods suitable for microchemical differentiation in tissue may prove inadequate for blood work.

The facts that the substance stains mahogany-brown with iodine, that it exists normally in the leucocytes, and that it is highly soluble, are, to say the least, strongly suggestive of its identity with glycogen.

To explain the pathogenesis of iodophilia there are two equally plausible theories, of somewhat different mechanism, but similar in that each admits that glycogen is a normal constituent of the leucocytes and in that each

*Read before the Pathological Society of Philadelphia, Dec. 28, 1905.

presupposes that some toxic principle must, so to speak, first cripple the cells before their glycogen content can be demonstrated. Thus, according to one theory (proposed by Wolff[1]), iodophilia means that the cell-glycogen, normally so soluble in water that it is not affected by ordinary staining methods, has become, through a toxic influence, abnormally insoluble, and in consequence exhibits its affinity for iodine, being colored distinctively by this metal even in the dried blood film. According to another theory (fathered by Sorochowitsch[5]), the reaction depends on an interference, toxically bred, with the activity of a normal ferment which in conditions of health rapidly and effectually transforms the cells' free glycogen in glycose for combustion into excretory end products. Owing to this defect in catabolism glycogen accumulates within the leucocytes in sufficient excess to be recognized microchemically.

To the clinical inquirer it is perhaps immaterial which of these interesting hypotheses be accepted. The fact remains that iodophilia may rationally be interpreted as a sign of leucocyte degeneration caused primarily by a toxemia which renders the glycogen component of the cells abnormally susceptible to the selective action of iodine.

PRESENT STATUS OF IODOPHILIA.

The iodine reaction has been a matter of more or less current medical interest since 1883, when Ehrlich[2] described it especially in relation to pus cells. No one, however, seems to have taken up the test from a clinical standpoint until 1891, the date of Gabritschewsky's careful studies of its occurrence in diabetes mellitus and in leukemia. Within the next ten years or so some half-dozen important contributions on the subject were published by European workers, prominent among whom may be mentioned Goldberger and Weiss,[4] Livierato,[6] Czerny,[3] Kaminer,[7] and Hofbauer.[8]

The activity of these investigators produced a mass of data which, though on the whole consistent, were in some details so conflicting that prudent clinicians hesitated to place dependence on the test. It was this general lack of confidence that for several years made the term iodophilia synonymous with an interesting laboratory test, not seriously to be considered as a helpful method of diagnosis. The chief results of all of this uncorrelated labor may be briefly summed up in the statement that the iodine reaction occurs with great constancy in conditions of toxemia, both bacterial and non-bacterial; that it signifies a lowered vitality of the iodophilous cells; and that its exact nature is not definitely understood. Of bacterial toxemias productive of iodophilia, such conditions as pyogenic abscess, general sepsis, and many of the specific febrile infections are the underlying factors; while iodophilia excited by non-bacterial or chemical toxemia may develop, for example, in diabetes mellitus, in leukemia, in dyspnea, in acetanilide poisoning, after ether narcosis, and, perhaps, in high-grade anemias.

In passing, it is of interest to recall Goldberger's success in producing iodophilia in dogs by the administration of peptone and also by rendering them diabetic by pancreatectomy.[4] Kaminer[7] observed the reaction in animals injected with the toxins of the pneumococcus, the Klebs-Loeffler bacillus, the Eberth bacillus, and various pyogenic bacteria; and Spezia[9] noted the change in animals treated with large doses of glucose and of olive oil, given subcutaneously.

Here may be mentioned the effect of glycogen on the leucocytes, as recently determined in a number of preliminary experiments made by Dr. Wakefield and myself. In seven hospital patients, whose blood counts were practically normal, we observed the prompt development of moderate leucocytosis and distinct iodophilia after the administration of glycogen hypodermically, the intensity of the iodine reaction apparently being related closely to the amount of the drug given. This detail, together with other conclusions derived from these experiments, will be reported in a subsequent article.

Within the past four or five years the subject of iodophilia has been studied with renewed interest, especially in this country, where excellent work has been reported by Cabot and Locke,[10] Dunham,[11] Dunn,[12] and Keen.[13] Abroad similar investigations have been carried on, notably by Mannaberg,[14] Loeper,[15] Schmidt,[16] Gulland,[17] and Reich.[18] But in spite of these efforts little new light has been thrown on the subject of the iodine reaction, the precise nature and many phases of which still remain moot points, or, indeed, have been quite unprobed.

OBJECTS AND TECHNIQUE.

The objects of this inquiry are to study, from both clinical and laboratory view-points, this leucocytic reaction to iodine, and, by correlating the data thus obtained, to deduce facts by which the scope and limitations of the test may be established and its true diagnostic value interpreted.

With these objects in view, one hundred patients suffering from various acute infections and chronic disorders have been examined clinically and notes have been made of their important symptoms. Blood films obtained at the time of the bedside examinations were then stained for the iodine reaction, and in fifty of the cases hemoglobin estimates and counts, both absolute and differential, of the erythrocytes and the leucocytes were also carried out. In fifty of the positive reactions the percentages of iodophiles and of the different types of such cells, described in a subsequent paragraph, were calculated, by examining one hundred leucocytes found in consecutive fields of the microscope.

Thus the attempt has been made to ascertain the relation and incidence of iodophilia, to investigate the types, degrees, and other characteristics of the reaction; and to study in detail its relation to anemia and to the quantitative and qualitative condition of the leucocytes. In addition to these examinations of pathologic bloods, films from healthy subjects were also studied by an identical technique, to serve as controls. In no one of the twenty normal blood specimens, examined as a preliminary step, was a positive reaction noted, and in the numerous controls examined subsequently, as the occasion demanded, the results were uniformly negative. About one-half of the clinical material was obtained at the German Hospital, where I was fortunate enough to have the assistance of Dr. William Warren and Dr. J. Bernard Mencke, internes at that institution, in verifying details of the case histories; the remainder of the cases were examined at the Jefferson Medical College Hospital and at the Philadelphia General Hospital.

The technique used in the following tests was essentially that advised by Ehrlich[9]—the treatment of the air-dried blood film, unfixed and spread on a cover-glass, with a reagent consisting of iodine 1, potassium iodide 5, and distilled water 100 parts, to which 50 parts of gum arabic are added, in order to give the mixture a syrupy consistence. The specimen is simply mounted on a glass slide by means of a drop of this reagent, and then examined microscopically with a one-twelfth-inch oil immersion objective after a lapse of about five minutes. Five minutes' exposure of the film to the fumes of iodine crystals (Zollikofer's method[19]) and then mounting in levulose, gives equally satisfactory results. Prolonged treatment with iodine does not develop iodophilia in a normal blood film, nor does it appear to intensify a reaction produced by a brief exposure to the reagent.

In about one-half of the differential counts Wright's stain was used, and in the others the iodine stain afforded clear differentiation of the various types of leucocytes and erythroblasts. Dare's hemoglobinometer and the Thoma-Zeiss hemocytometer were used in the hemoglobin and cellular estimate, respectively.

SUMMARY OF RESULTS

Aside from uniformly negative results in testing 20 normal bloods for iodophilia, the reaction was tried with 100 pathologic bloods, of which it was positive in 64. In all of these positive cases it was reasonable to attribute the result of the test either to the effect of frank pyogenic sepsis or to the influence of chemical toxemia. The results of these tests have been briefly summarized in the accompanying Table I.

TABLE I.

SUMMARY OF IODOPHILIA TESTS IN 100 CASES.

Clinical Diagnosis.	No. of Cases.	Iodophilia Positive.	Iodophilia Negative.
Enteric fever	26	9	17
Croupous pneumonia	7	7	0
Sepsis; abscess*	30	30	0
Tuberculosis†	3	1	2
Carcinoma	3	2	1
Gonorrheal arthritis	4	4	0
Rheumatic fever	2	0	2
Primary anemia‡	5	4	1
Diabetes mellitus	3	3	0
Catarrhal appendicitis	4	2	2
Amyloid liver	2	2	0
Endometritis	2	0	2
Nephroptosis	2	0	2
Cholelithiasis	2	0	2
Biliary cirrhosis	1	0	1
Ovarian cyst	1	0	1
Rickets	1	0	1
Malarial splenomegaly	1	0	1
Acetanilide poisoning	1	0	1

*Including general sepsis, purulent peritonitis, appendiceal abscess and gangrene, gall-bladder empyema, pelvic abscess, pyosalpinx, purulent colitis, hepatic abscess, and osteomyelitis.

†Positive in acute pneumonic phthisis; negative in chronic ulcerative phthisis and in tuberculous peritonitis.

‡Positive in pernicious anemia and in myelogenous leukemia; negative in Hodgkin's disease.

Of 26 cases of enteric fever, the nine which showed iodophilia were types of severe infection with the Eberth bacillus, complicated in two instances by pneumonia, and in one each by local peritonitis, by free intestinal hemorrhage, and by general septicemia. Of 11 uncomplicated enterics examined during and after the fourth week of the disease, two reacted positively.

In enteric fever iodophilia may develop as the result of an intense typhoid infection, or it may betray the presence of such complicating factors as pneumonia, purulent lesions,

peritonitis, and, perhaps, high grade secondary anemia. In this disease the iodine reaction has no specific diagnostic value, since it may be symptomatic of many diverse conditions. In uncomplicated cases the presence of a well-marked iodine reaction on the part of a large proportion of the leucocytes is significant of an intense infection. In obviously complicated cases a positive reaction is corroborative of the more definite clinical findings.

Of 30 purulent and septic cases, the reaction was positive in all, its intensity in these conditions probably depending on the virulence of the infecting principle rather than on the extent of the suppuration and the identity of the invading bacteria. In abscess free permeability of the limiting pyogenic membrane favors the occurrence of the reaction, while thorough walling off of the pus focus, as well as adequate drainage, is not attended by iodophilia. In this class of cases are included appendiceal abscess and gangrene, pelvic abscess, gall-bladder empyema hepatic abscess, purulent peritonitis, and general septicemia. In addition to uniformly positive findings in 16 cases of purulent and gangrenous appendicitis, iodophilia was found also in two cases of simple catarrhal inflammation of the appendix, the reaction being very conspicuous in one instance, and very faint, though unmistakable, in the other. In spite of careful search for a reason for the reaction in these instances, none was discovered—neither patient was septic, anemic, strikingly febrile, nor handicapped by any sort of complication. The results, therefore, must remain unexplained, unfortunately to the detriment of the test as a criterion for discriminating the catarrhal and the suppurative forms of the disease.

In croupous pneumonia the seven cases in which the reaction was tried all gave positive results. The blood of these cases was examined during the height of the precritical period of the disease, and gave examples of the most striking types of the reaction encountered in the entire series of cases included in this report. In no other disease, not even in grave streptococcus septicemia, does so high a degree of iodophilia develop as that ordinarily met with in the active stages of pneumonia. After crisis the iodophilia begins rapidly to disappear, and in the uncomplicated case does so completely within about forty-eight hours after the critical defervescence. Persistence of the reaction beyond this period may be symptomatic of delayed resolution, of pulmonary abscess, of empyema, or of some other sequel of the pneumococcus infection.

Four cases of gonorrheal arthritis showed iodophilia in a decided degree, while, on the other hand, the reaction was wanting in two cases of acute rheumatic fever. The bearing of these results on the differential diagnosis of these two conditions is too self-evident to call for further comment.

Positive results were also obtained in the following diseases: acute pneumonic phthisis, carcinoma, pernicious anemia, myelogenous leukemia, diabetes mellitus, and amyloid liver; while, in addition to the diseases already specified, iodophilia was not noted in this list: endometritis, cholelithiasis, biliary cirrhosis, malarial splenomegaly, ovarian cyst, rickets, and acetanilide poisoning.

TYPES OF IODOPHILIA

Iodophilia occurs in the cytoplasm of the leucocytes as a diffuse brownish discoloration (Fig. V), as a granular stippling (Fig. III), and as a combination of the two (Fig. IV). The change is restricted absolutely to the protoplasm of the cells and does not implicate their nuclear structure, though the latter may be mottled with discrete refractile points which, at first glance, superficially resemble the iodophile reaction. The color of the reaction ranges within very wide limits—from a delicate shade of tan to a deep mahogany-red in the diffuse type, to almost black in the granular variety. The general rule holds true, that the smaller the iodophilous cell the deeper its color, this tendency being similar to that prevailing in other methods of blood staining; with the Ehrlich or with the Romanowsky stain, for example, the smaller neutrophiles with densely crowded granules in their cell body stain more conspicuously than their larger prototypes whose granules are relatively few in number and sparsely distributed.

Regarding the relative incidence of the various types of iodophilia, it may be said that simple diffuse staining of the cells and diffuse plus granular reactions occur with about equal frequency, while cells showing a purely granular stippling are exceedingly uncommon. Of the 50 cases of the series studied differentially, 25 showed simply diffuse staining, 24 both diffuse and granular changes, and the remaining single case purely granular mottling of the protoplasm.

In the *diffuse type* of iodophilia the deepest coloring is generally observed in the neighborhood of the nucleus and at the periphery

of the cell, the intervening protoplasm being either of a diffuse, even, lighter brown shade, as is the rule in reactions of moderate intensity; or blotched irregularly with deep mahogany colored areas on a paler undertone, as is the general finding in reactions of more striking intensity.

In the *granular type* the individual granules vary in size from that of the most delicate neutrophile to that of the coarsest mast cell; their distribution is generally toward the periphery of the cell; and their shape is spherical or ovoid. Although some of the larger granules may show a ragged, uneven outline, they invariably remain discrete and never fuse into conglomerate masses, as is the apparent tendency of the extracellular bodies of similar morphology.

VARIETIES OF LEUCOCYTES IMPLICATED.

In the vast majority of positive reactions the polynuclear neutrophile cells, and this type of leucocytes only, show the iodine changes (Figs. III, IV, V). In but one case did I find these cells unaffected in blood containing other iodophilous leucocytes. Less commonly the lymphocytes, especially the small variety, are iodophilous, and occasionally these cells bear on their extreme outer margin three or four coarse deep mahogany-colored spheres conspicuously contrasting with the scanty rim of cell body to which they cling (Figs. I and II). Other lymphocytes show a cytoplasm sprinkled with delicate granules similiar in size, in intensity, and in distribution to those occurring in a delicately stippled basic erythrocyte. Next in frequency the neutrophile myelocytes are affected, though not so commonly as would be naturally expected, from their close biologic relation to the polynuclear neutrophiles (Fig. VII). Very rarely an occasional eosinophile is found to be iodophilous; this I detected in two instances, in each of which the reaction was both diffuse and coarsely granular, but in neither of which were more than two per cent of the total number of leucocytes thus affected (Fig. VI). With the exception of these two cases and one instance reported by Zollikofer,[19] iodophilia of the eosinophiles has not been recorded before, so far as I am able to ascertain. Neither Cabot nor Locke has met with it in their extensive series of cases, and Simon[20] distinctly states that eosinophiles are never implicated. I have never seen an iodine-stained mast cell.

Of fifty differential counts in positive reactions, there were 10 in which leucocytes other than polynuclear neutrophiles showed iodophilia. The identity of these cells and their proportion to the total number of iodophiles are given in Table II.

TABLE II.

TYPES AND PERCENTAGES OF IODOPHILES OTHER THAN POLYNUCLEAR NEUTROPHILES IN 50 POSITIVE REACTIONS.

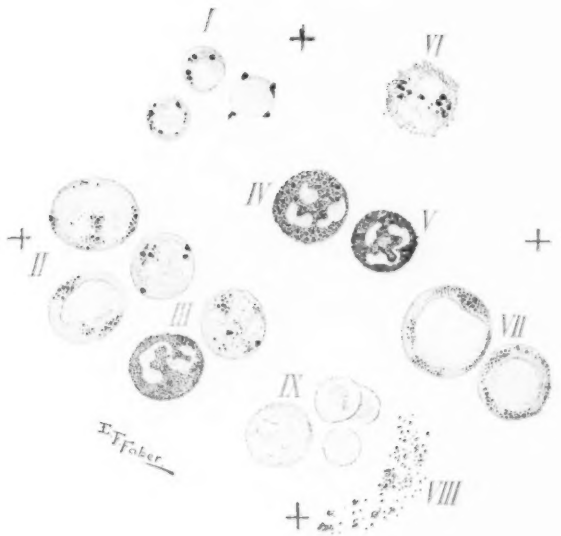
Case No.	Diagnosis.	Type of Iodophiles.	Per cent to total Iodophiles.
3	Purulent peritonitis	Large lymphocyte.	3.5
		Transitional form.	2.0
7	Appendiceal abscess and gangrene	Small lymphocyte.	1.0
11	Appendiceal abscess	Eosinophile	2.0
12	Acute pneumonic phthisis	Small lymphocyte.	4.0
		Transitional form.	1.0
15	Croupous pneumonia	Myelocyte	1.6
		Eosinophile	2.0
22	Enteric fever	Myelocyte	2.0
34	Croupous pneumonia	Myelocyte	2.0
45	Sepsis	Small lymphocyte.	5.0
50	Diabetes mellitus	Small lymphocyte.	1.0
82	Enteric fever	Small lymphocyte.	2.0

Although leucocyte débris, much of it presumably of plasmolytic origin, commonly stains with the iodine reagent, the frankly degenerate leucocyte, so long as it remains structurally intact, does not appear thus to react. In many of the bloods examined vacuolated, but otherwise normal, neutrophiles were found, sometimes in abundance, but in none of these examples of early plasmolysis was the slightest iodine reaction detected. This peculiarity I have studied with particular interest, for it was natural to believe that beginning cell destruction would be attended with more or less iodophilia. It seems, however, that the latter is related to some chemical change in the cells, of which their microscopic signs of degeneracy are by no means a criterion.

Since the above paragraph was written I have had the opportunity to study a case of acute lymphatic leukemia in which the blood contained an extraordinarily large number of mitotic lymphocytes. In several of these cells (both in those with monaster and with diaster figures) fine iodophilous stippling was observed, and diffuse iodophilia of the polynuclear neutrophiles was also noted.

INTENSITY OF THE REACTION.

For clinical purposes it simplifies matters to gage the intensity of the reaction rather by the depth of color shown by the iodophilous cells than by their actual number. Thus, if the prevailing shade be deep brown or mahogany, it is convenient to designate the reaction as "intense;" if light brown, as "moderate;" and if dull orange, as "faint." It cannot be denied that the troublesome "personal equation" of the examiner must be reckoned with in judging these criteria, yet, on the whole, those familiar with the various



IODOPHILIA.

(Goldberger-Weiss Stain. Leitz 1-12 in. oil-immersion objective; ocular 4.)

I. Coarsely-granular reaction in small lymphocytes. Note the ragged peripheral rim of brown protoplasm in one of the cells, and the discrete perinuclear masses in the other two.

II. Iodophilous large lymphocytes. In this type of the leucocyte the distribution of the granules is extremely uneven and their size variable.

III, IV, V. Iodophilous polynuclear neutrophiles. The three cells, III, illustrate the purely granular type of iodophilia, one being stippled with exceedingly fine and the others with very coarse granules. Cells IV and V show the commonest variety of the reaction—diffuse plus granular (IV) and simple diffuse (V) staining.

VI. Eosinophile with iodophilous staining of cytoplasm.

VII. Iodophilous myelocytes.

VIII. Extracellular iodine-stained masses, from normal blood.

IX. Normal polynuclear neutrophile and erythrocytes after treatment with the iodine reagent.

phases of the reaction employ them with a surprising uniformity of results. The cells grouped in Figs. II, III, IV, and V are good examples of the variations in the intensity of the reaction.

Of the 50 examples of positive tests analyzed with reference to the intensity of the reaction, 15 were labeled intense, 22 moderate, and 13 faint, according to the standards above noted From this analysis it was found that, while usually a striking color intensity means also a high numerical degree of iodophilia, it cannot always be said that the qualitative and the quantitative changes progress *pari passu*. It is significant, however, that in no intense reaction of this series did the proportion of iodophilous leucocytes fall below 25 per cent of the total number of cells examined, and that in most of the cases their percentage approximated, and often exceeded, 50. This is shown in Table III, which gives an idea of the abundance of iodine-stained cells in each of the three grades of the reaction.

TABLE III.

PERCENTAGES OF IODOPHILES IN 50 CONSECUTIVE POSITIVE REACTIONS.

Grade of Reaction.	No. of Cases and per cent of Iodophiles			Total.
	50 per cent.	25 to 50 per cent.	25 per cent	
Intense	9	6	0	15
Moderate	3	12	7	22
Faint	1	6	6	13

The degree of iodophilia in any given blood film reacting positively is determined partly by the activity of the toxemia in the individual case and partly by the inherent vulnerability of the cells. An abundance of deeply stained cells is commonly met with in septic cases with febrile disturbances, prostration, and other signs of severe infection, and in such instances it seems reasonable to regard the reaction as a rough gauge of the toxemia. Well defined iodophilia may also occur in those who suffer from non-septic diseases, and who, though acutely ill, show no signs of a grave systemic intoxication. In these cases it is possible that the cells are pathologically hypersensitive, and in consequence are highly susceptible to the action of the staining reagent. In either event it is not unreasonable to attribute to individual cell peculiarities a certain influence in determining the incidence and the intensity of the reaction. As already remarked, the technique of staining, as ordinarily practiced in clinical work, has no influence on the intensity of a positive reaction; a film stains no more intensely after twenty-four hours' exposure to the reagent than after an exposure of twenty-four minutes. This point I have repeatedly verified in the series of cases under discussion.

RELATION BETWEEN IODOPHILIA AND LEUCOCYTOSIS.

In order to determine, if possible, this question, 35 consecutive cases with leucocytosis and the same number without leucocytosis are taken as a basis of the deductions. In this connection it should be explained that counts of 10 000 per cubic millimeter or higher are regarded as leucocytosis, and those below this figure as normal or leucopenic, as the case may be.

The mere question of leucocytosis has not, *per se*, the slightest bearing on the production of iodophilia. This somewhat broad statement can be repeatedly verified by any one who has done much work with the reaction, and who, before drawing conclusions, takes the precaution to investigate the individual cases from the clinical as well as the laboratory standpoint. Toxemia, not the leucocyte range, is the factor of the reaction, and this being the case, it is easy to understand why the blood of a profoundly septic person may show intense iodophilia with decided leucopenia, while high leucocytosis without iodophilia is not incompatible with a disease exciting a toxemia sufficient to stimulate the cells' overproduction, but not intense enough nor of the requisite character to affect them structurally.

It is true that a study of averages (which may mislead or guide according to one's viewpoint) shows beyond doubt that iodophilia is far more frequent in connection with leucocytosis than it is with normal counts. But this simply means that, as a rule, leucocytoses are symptomatic of more or less toxemia and that normal counts generally mean an absence of such a condition. Thus, in the cases under consideration those with leucocytosis showed 88.5 per cent of positive iodine reactions, while those with normal or subnormal counts gave but 27 1 per cent.

Detailed analysis of these figures shows that 24 of the 31 positive reactions with high leucocyte estimates were associated with definite, sometimes most decided, sepsis, symptomatic of appendiceal abscess and gangrene, gall-bladder empyema, pelvic abscess, pyosalpinx, hepatic abscess, puerperal sepsis, phthisis with cavity formation, croupous pneumonia, and septic enteric fever; of the

remaining 7 positive reactions the clinical pictures were those of diabetes mellitus, amyloid liver, carcinoma, malarial cachexia, and uncomplicated enteric fever. The four negative reactions in this class of cases were met with in rheumatic fever, in biliary cirrhosis of the liver, and in myelogenous leukemia.

Of the 35 cases without leucocytosis, grave sepsis figured in 9 of the positive results, well marked infections in 7, and in the remaining 4 acute non-suppurative appendicitis and pernicious anemia, each 2 cases. Of the 15 negative tests in this group, none was, in a clinical sense, obviously toxic, the diagnoses being as follows: uncomplicated enteric fever in 4 instances; nephroptosis in 2; gallstone colic in 2; and enteralgia, ovarian cyst, gastric cancer, rickets, uterine hemorrhage, tuberculous peritonitis, and Hodgkin's disease in a single case each.

RELATION OF IODOPHILIA TO QUALITATIVE LEUCOCYTE CHANGES.

This relationship was investigated by comparing, individually and collectively, the differential counts in 50 consecutive positive reactions with the degree of the latter, judged by the standards above explained. Taking as a qualitative index the percentage of polynuclear neutrophiles, the proportions of this type of leucocytes to the other forms of cells in the three different grades of iodophilia are expressed in Table IV.

TABLE IV.

PERCENTAGE OF POLYNUCLEAR NEUTROPHILES IN 50 CONSECUTIVE POSITIVE REACTIONS.

Grade of Reaction.	No. of Cases.	Per cent of Poly. Range.	Neutrophile Average.
Intense	15	64 to 91	81 2
Moderate	22	71 to 88	82.7
Faint	13	68 to 87	71.4

These results suggest that in faint reactions the differential leucocyte counts more nearly approach the normal standard than in well marked reactions. That the latter show higher polynuclear figures is to be expected, for this grade of iodophilia is very commonly accompanied by absolute leucocytosis, which of course means pathologically high numbers of polynuclears, the very cells most susceptible to iodine. And in most instances it must be also assumed that the cells' resistance is lowered, owing to the deleterious effects of the toxic factors responsible for their unusual abundance in the circulating blood.

But it is going too far to presume that the higher the polynuclear percentage the more intense the iodophilia in the individual case. Though this may be true of the average, it is not always applicable in the isolated instance, since occasionally one meets with a most striking degree of iodophilia in blood showing a normal or even a subnormal number of polynuclear neutrophile cells. In this connection it may be recalled that Kaminer[1] has shown that polynuclear iodophilia of the bone-marrow and of the peripheral blood are intimately related. This worker proved that in animals circulatory iodophilia of the polynuclear neutrophiles was invariably associated with a similar marrow change, and that in normal animals the neutrophiles of the marrow never showed the slightest evidence of susceptibility to iodine. The association of circulatory and myeloid iodophilia I have observed in one instance—a case of lymphatic leukemia whose blood during life and whose bone-marrow after death showed lymphocytic and neutrophilic iodine-stained cells.

RELATION BETWEEN IODOPHILIA AND ANEMIA.

The study of this phase of the reaction is based on 50 cases in which the percentage of hemoglobin and the number of erythrocytes were determined. In the analysis of these data cases with hemoglobin figures of 60 per cent or less and erythrocyte counts of 3,000,000 or lower were arbitrarily classed as anemic, while those with blood counts higher than these standards were considered non-anemic, 10 of the counts falling in the former and 40 in the latter group.

Anemia cannot be regarded in any strict sense as a factor of iodophilia, for just as striking reactions are met with in patients with perfectly normal counts as in those with acute, high-grade anemia. Even if it be assumed that there are actively toxic principles at work in certain anemias, notably in those of the pernicious type, the deleterious effects of such substances cannot be potently directed toward the leucocytes, if the susceptibility of these cells to iodine be taken as a sign of such an effect.

In typical instances of primary pernicious anemia, with extreme blood deterioration and the distinctive hall-mark of a megaloblastic blood picture, the reaction, when indeed one occurs, is not comparable in intensity to one provoked by, say, a case of frank septicemia. In repeated examinations of two cases of Addisonian anemia I have been unable to find anything more definite than an extremely faint degree of diffuse iodophilia, affecting a minimum of 14 per cent of the leucocytes, and a maximum of 40 per cent. The hemoglobin ranged in these two cases between 24 and 40 per cent, and the erythrocytes be-

tween 670,000 and 2,060,000 per cubic millimeter.

In the present series the difference between the incidence of iodophilia in anemic and non-anemic cases was too trivial to be seriously considered. The reaction was present in 7 (70 per cent) of the 10 anemic cases, and in 30 (75 per cent) of the 40 non-anemic. In every instance some adequate toxic factor existed, aside from the question of anemia, to account for the iodophilia, when it occurred. In view of this experience I am unable to subscribe to Hofbauer's belief[8] that the intensity of the reaction is proportionate to the severity of the anemia with which it is associated. Nor is it easy to put faith in this author's opinion that the occurrence of iodophilia in anemic conditions is of unfavorable prognosis. However, I cannot present data to fortify this view, which perhaps will have to pass as merely personal skepticism.

RELATION BETWEEN IODOPHILIA AND PYREXIA.

From a study of 56 cases in which the temperature was taken at the time of the blood examination, it is not possible to substantiate Kaminer's statement[7] as to the active part taken by fever in the production of iodophilia. Of the present series, 24 patients had fever ranging between 101.6° and 105° F., and in this group 17 positive and 7 negative tests for iodophilia were noted; in the remaining 32 patients the temperature ranged from 96.8° to 101.4° F., and of these the reaction was positive in 23 and negative in 9. Thus, in these two classes, arbitrarily divided into those with three degrees or more of fever and into those without fever or with less than three degrees, the percentage of positive results was practically identical—70.8 per cent for the febrile and 71.8 per cent for the so-called afebrile group. As an illustration of marked reactions in practically afebrile patients the data in Table V may be of interest.

TABLE V.

Case No.	Diagnosis.	Temp.	Leucocyte Count.	Degree of Iodophilia.	
				Intracellular.	Extracellular.
7	Appendiceal abscess and gangrene....	98.8°	14,500	42 per cent.	12 per cent.
17	Appendiceal abscess.....	97.8°	9,000	68 per cent.	19 per cent.
33	Appendiceal gangrene ..	99.2°	7,000	76 per cent.	8 per cent.
38	Diabetes mellitus.....	96.8°	13,800	24 per cent.	0 per cent.
39	Diabetes mellitus.....	98°	4,000	31 per cent.	0 per cent.
44	Amyloid liver.....	97.8°	21,200	43 per cent.	2 per cent.

In all of the above patients ample factors of iodophilia existed, as will be seen from the character of the clinical diagnoses.

In comparison with the above, Table VI shows seven negative reactions occurring in patients with more or less fever at the time of the test.

TABLE VI.

Case No.	Diagnosis.	Temp.	Leucocyte count.
23	Salpingitis.....	102.8°	8,600
36	Biliary cirrhosis.....	102°	10,100
46	Endometritis.....	102.4°	6,000
58	Enteric fever.....	100.6°	4,500
61	Enteric fever	102°	9,000
64	Enteric fever..... ...	101.6°	6,000
72	Enteric fever.....	104°	8,000

The underlying cause of a febrile state—septic intoxication, for example—is to be held responsible for the positive reaction occurring in a febrile patient, but to pyrexia alone can be ascribed no such influence.

CONCLUSIONS.

The following conclusions relating to the pathologic and clinical phases of iodophilia may be summarized:

1. In the dry blood film intracellular iodophilia indicates a form of leucocyte degeneration of toxic origin, and due presumably to an abnormal affinity of the cell glycogen for iodine. The same reaction in the fresh wet blood film is physiologic. Extracellular iodine-stained masses in the plasma have no definite pathologic significance, so far as can be determined.

2. The toxic factor of the reaction may be absolute and frankly demonstrable, as in pyogenic septicemia and in pneumonia; or it may be indefinite and masked, as in pernicious anemia and in cachectic states.

3. The reaction is restricted to the cytoplasm of the leucocytes, never affecting their nuclear structure. In fully 98 per cent of all reactions the polynuclear neutrophiles are implicated; in about 20 per cent other cells, notably the lymphocytes, and less commonly the myelocytes, also react; in the exceptional instance iodophilous eosinophiles are noted. Diffuse and diffusely granular brown staining are the prevailing microchemical changes, pure granular stippling being exceedingly rare.

4. The number of iodine-stained cells corresponds roughly to the color intensity of the reaction, 50 per cent or higher of iodophiles being generally found in a decided, and approximately 25 per cent in a feeble, reaction.

5. Iodophilia has no direct relation to leu-

cocytosis, to anemia, or to pyrexia. (*a*) Its relative frequency in patients with high leucocyte figures is due to the fact that such cases are generally toxic; a similar toxemia with leucopenia excites just as intense a reaction. (*b*) The grade of anemia in no wise corresponds to the incidence or to the intensity of the reaction. (*c*) Fever *per se* has absolutely no effect in causing iodophilia, afebrile cases and those with hyperpyrexia showing an equal percentage of positive results.

6. From a clinical view-point, iodophilia is often a helpful, though under no circumstance a diagnostic, sign, and to be of real service to the clinician it should be correlated with every other detail of the clinical picture. Thus interpreted, a positive reaction in a person obviously ill means that the systemic effect of the illness, whatever it may be, is vigorously exerted in so far as its harmfulness to the patient in question is concerned; in this connection the sign is useful in the study of such diseases as enteric fever, pneumonia, diphtheria, general sepsis, and many of the severe cachexias. Especially is iodophilia significant when associated with a leucopenia symptomatic of overwhelming prostration of the individual; iodophilia plus leucocytosis indicates simply an intense infection with an adequate systemic counteraction.

In the differentiation of various specific clinical entities one must be extremely cautious in accepting iodophilia as a criterion. Personally I have found the test corroborative in differentiating both gonorrheal arthritis and osteomyelitis from rheumatic fever; pure tuberculosis from tuberculosis with secondary pyogenic invasion; ovarian abscess from ovarian cyst; and amyloid liver from fatty cirrhotic liver. In distinguishing purulent from non-purulent lesions, it must be recalled that the former always give a positive reaction, unless the abscess is so effectually walled off that toxins cannot reach the circulation; and that the latter give a negative reaction, unless there happens to be some other source of toxemia at work. These possible sources of error are extremely exceptionable, but it cannot be denied that they must be heeded in an occasional instance.

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AN IMPROVED METHOD OF GASTROSTOMY.

A great improvement over the older methods of forming fistulæ is claimed by TAVEL (*Centralblatt für Chirurgie*, No. 23, 1906), who connects the stomach and abdominal wall by means of a length of intestine freed from its connection to the bowel, but retaining its mesenteric attachment. The operation is indicated in all forms of esophageal stricture, and is performed as follows:

An incision 4 inches long is made so that one-third lies above and one-third below the navel. The abdomen being open, a well vascularized loop of intestine with as long a mesentery as possible is selected, and a piece 6 inches long resected and wrapped in gauze, while the cut ends of the remaining intestine are united. The mesocolon and omentum are then punctured and the loop drawn through this opening, as in retrocolic gastroenterostomy. The anal end of the free piece of bowel is united to an opening in the anterior wall of the stomach, and the other end to an opening in the abdominal wall. This allows feeding at once without soiling the operation wound. In this way a new esophagus is formed with peristalsis toward the stomach. There is absolutely no leakage even though vomiting occurred in one case.

The operation was performed on two dogs, and later on a man, with good result in each case.

The Therapeutic Gazette

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Leading Articles.

FEEDING IN TYPHOID FEVER.

Readers of the editorial columns of the THERAPEUTIC GAZETTE probably know full well that the writer of this editorial note is strongly in favor of a more liberal diet in the feeding of typhoid fever patients than is usually given by most practitioners. As we have repeatedly pointed out, there can be no doubt that in the average case of typhoid fever the administration of a diet which approximates in its food value the diet ordinarily taken by the patient in health brings the patient to convalescence in a far better state than does the absolute milk or broth diet which for so many years has been strictly adhered to. The idea that the administration of ordinary foodstuffs increases the danger of perforation in typhoid fever has always seemed without basis. The ulcers in the intestines are so far away from the stomach that it is incredible that any food, soft enough to be swallowed, should reach these areas in a sufficiently firm or hardened state to poke its way through the floor of an ulcer, or even aid in the opening of a blood-vessel and the production of an intestinal hemorrhage. On this ground, therefore, the administration of solid foods to typhoid fever patients cannot be combated. It can be combated, however, on the basis that the digestive juices are scantily secreted during the course of this disease, and therefore the stomach and doudenum are poorly qualified to deal with substances which, under ordinary circumstances, they would digest with ease. This disadvantage or difficulty can, however, be easily overcome by the preparation of the food in such a way that it can easily be attacked by the digestive ferments, and by aiding physiological digestion by the addition of digestive substances which are qualified to act with a good deal of power upon the foodstuffs which provide satisfactory sustenance for these cases. If hydrochloric acid and pepsin are given whenever there is any evidence of failure to digest cup custard, curds and whey, and similar preparations, and taka-diastase and pancreatin are employed when starches are given, and the quantities of these various foodstuffs are carefully controlled, we have yet to see a case in which their administration has produced anything but excellent results. It is of the greatest importance that the quantity of food administered to each patient should not be controlled by routine rules, but should be varied to suit the digestive ability and the actual needs of the individual case. At times, when the digestion seems to be somewhat burdened, a very light diet should be adhered to for a few hours, or a day, or even longer. At other times a considerable quantity of food can be given which will not only be adequate for the moment, but which will serve to compensate for the temporary and partial starvation to which we have just referred. At times, too, starchy foods will do best, and at others proteids will prove most satisfactory.

The administration of food in typhoid fever is much like the administration of medicine. The orders controlling it must depend upon the condition of the patient from day to day. The only difference is that many cases of typhoid fever need no drugs from one end of the attack to the other, but every case needs some food. As we have pointed out before, a milk and broth diet in the quantities which it is

possible for a patient to ingest is entirely inadequate to maintain the nutrition of a healthy person, and still more inadequate to maintain the nutrition of one in whom, as the result of fever, oxidation processes are going on with great rapidity.

Closely associated with this question of the administration of food in typhoid fever is that of the administration of water. We are prone to forget, at times, that a very large part of the human body consists of fluid, and in those cases of typhoid fever which are too stuporous to recognize their own thirst and call for water, concentration of the blood, deficient urinary secretion, and constipation result, unless the patient is required to take three or four pints of liquid in twenty-four hours. As a rule this liquid should be given in small quantities, frequently repeated, and never in large enough amounts to burden the stomach.

We are glad to note that the medical literature of the past year has included a number of articles by active clinicians in which the feeding of typhoid fever patients with easily digested foodstuffs has been strongly advocated, and we are sorry to note that in one or two instances articles have appeared in which the so-called starvation treatment of typhoid fever has been advised. The starvation diet may be suitable to some of those acute infectious diseases which run a very brief course, but in a prolonged, wasting illness like typhoid fever it cannot, except in a very small proportion of cases, be advisable; although, as we have already said in this editorial note, occasions may arise in the course of typhoid fever when no food at all may be advantageous for a day or two until the digestive system, which is temporarily disordered, has had time to readjust itself.

THE VALUE AND LIMITATION OF THE BROMIDES.

There are few drugs in the Pharmacopœia which possess so marked a physiological action and which are so incapable of producing serious results, if given in single large doses, as the so-called bromides. Although single doses of bromides are practically incapable of producing harmful results, we have called attention in the original and editorial columns of the GAZETTE, on a number of occasions, to the fact that the bromides are greatly abused, and that in many instances their persistent use produces results which are anything but desirable. Many years ago we called attention, in a collective investigation, to certain cases which were pointed out by Weir Mitchell, in which maniacal symptoms had developed after the use of the bromides, and we published in the GAZETTE the statement of a considerable number of physicians to insane asylums, and institutions for epileptics, which read to the effect that most epileptics brought under their care were so saturated with the bromides that several weeks elapsed before ordinary measures for the benefit of the patient could be resorted to, the time being devoted to the elimination of the bromides from the body and to the readjustment of normal processes which had been perverted by the large doses of the drug.

Our attention is called to this matter once more by a paper in *La Presse Médicale* of May 16, 1906, by Hartenberg, in which he points out that the administration of the alkaline bromides in the various neuroses is open to much controversy. There can be no doubt that these substances produce what he thinks are brilliant results in cases of epilepsy and nervous agitation, and in such conditions as hysteria, chorea, etc. On the other hand, there are a number of eminent authors who protest against the administration of bromides in very large doses, claiming that they aggravate the functional trouble. These writers go so far as to assert that the bromides should be banished from the therapeutic list except in the treatment of epilepsy, and assert that they should not be employed in neurotic states. The greatest contraindication of the bromides is the depressant effect which they exercise upon the nutrition of the organism. Their use diminishes the elimination of urea and phosphoric acid. As a large number of the neuroses are manifestations of functional disorders of nutrition rather than of pure functional nervous disturbances, Hartenberg believes that the bromides are distinctly contraindicated, and in cases of neurasthenia in which the nervous system is depressed their use still further increases the depression. Of course, the depression is most marked in those instances

in which very large doses of *potassium* bromide are used, lithium, strontium, and sodium bromide being much less depressant because the base in each instance is not so active. Probably the strontium is the most satisfactory of all these salts, but even it should not be given freely for long periods of time.

UNTOWARD EFFECTS PRODUCED BY THE SALICYLATES.

It is well-known fact, among active practitioners, that of all the drugs which produce untoward and undesirable effects in very susceptible individuals the iodides, quinine, and the salicylates stand first. In the vast majority of instances these disagreeable results, of the administration of therapeutic doses, consist in more or less well-marked eruptions upon the skin or disturbances of the mucous membranes, and in the case of quinine and the salicylates in the development of that train of symptoms which is commonly described under the term "cinchonism," two of the symptoms of which may become so severe as to actually amount to blindness and total deafness.

Many of the readers of the THERAPEUTIC GAZETTE will doubtless remember an interesting communication which was made some three years ago on the treatment of rheumatism by Dr. D. B. Lees, in which he urged the administration of very much larger doses of the salicylates in the treatment of acute articular rheumatism in children than are commonly given. Thus he urged, as acute articular rheumatism is an acute infection, and as the salicylates probably do good by overcoming the infection in much the same way that quinine does good in malarial fever, the use of from 100 to 300 grains a day of salicylate of sodium in children not more than six or ten years of age. He also pointed out that if, at the same time, equally large doses of bicarbonate of sodium were used, disagreeable symptoms rarely developed, and excellent results, so far as the rheumatism is concerned, speedily accrued. He admitted, however, that he had seen one case in which symptoms resembling those of diabetic coma arose.

Much interest in regard to this matter is once more aroused by a valuable communication which is published in the *Lancet* of June 30, 1906, in which Langmead reports a series of eight cases in children in which symptoms resembling those of diabetic coma developed when they were receiving very large doses of salicylates, and Langmead quotes some observations made by Quincke in 1882 of an instance of salicyl-dyspnea. Poynton had done likewise.

An examination of the urine of patients taking these immense doses of the salicylates results in the discovery of the presence of acetone in excessive quantities, particularly if symptoms of diabetic coma are present, and it is interesting to note that if the administration of the salicylates is stopped and full doses of bicarbonate of sodium are given hourly, the symptoms as a rule promptly disappear, the drowsiness decreasing, and the "air hunger" being dissipated. Thus, in one case the urine still remained acid, although the patient had taken 720 grains of sodium bicarbonate, but eventually the patient made a complete recovery.

The urine in these instances possesses the well-known acetone odor, and the curious and peculiar odor of so-called acetonemia in diabetes can also be noted on the breath. Sometimes this odor on the breath and the urine is noticeable before any other symptoms develop. That these manifestations can in no way be due to the employment of an impure salicylate is proved by the fact that Langmead made careful investigations as to the purity of the drug which was used.

As the result of his studies Langmead believes that: (1) Salicylate of sodium sometimes causes in children symptoms resembling the acid poisoning of diabetes. (2) The toxic dose is variable, depending on the idiosyncrasy of the patient and the presence or absence of constipation. (3) Acetone may be detected in the urine and in the breath, its presence constituting one of the first symptoms of the poisoning, and affording a valuable danger-signal. (4) Treatment should be directed to keeping the acidity of the urine low and the bowels open in cases of patients taking this drug. (5) If acetone is found or the urine gets more and more strongly acid the salicylates should be omitted and alkali given alone. If these points are borne in mind he feels sure that further calamities due to the use of the salicylates may be avoided.

CLINICAL AND EXPERIMENTAL OBSERVATIONS ON SURGICAL HEMORRHAGE.

Under this title Crile and Dolley contribute to *Surgery, Gynecology, and Obstetrics*, vol. iii, No. 1, a careful study on the subject of hemorrhage. They show by experiments and tracing that in all varieties of hemorrhage there is an immediate tendency to compensatory recovery, which is noted until such an exsanguinated condition is reached that the vasomotor center no longer responds actively to reflex stimulation. When the hemorrhage was continued until there was no spontaneous compensation and no response to reflex stimulation the animal could rarely be made to recover. The longer the interval of low blood-pressure without spontaneous compensation, the less marked were the effects of the stimulation of the vasomotor center, or other methods of treatment.

Crile emphasizes his teaching to the effect that the question of compensation—*i.e.*, recovery after operation—is one of dynamics and concerns largely the vasomotor center.

The experimenters noted that strychnia distinctly increased blood-pressure. The effect of this drug was inversely proportionate to the extent of the hemorrhage.

Saline infusions they found of great value and followed by an immediate rise of blood-pressure, excepting in those cases in which there was no natural compensation. These injections when given too rapidly may cause acute dilatation of the heart. When given continuously and excessively they produce a boggy, edematous condition of the splanchnic area, infiltrating the visceral walls.

Bandaging the extremities and trunk is a method of treatment devoid of hurtful influence and one which produces a moderate rise of blood-pressure, which is maintained.

Crile notes that the favorable effect of oxygen inhalation during the critical stages of hemorrhage is in almost every instance well marked.

In regard to the amount of blood as compared to the body weight that may be lost in hemorrhage the laboratory studies and the clinical experiments show that from two to three per cent of the body weight may leak away without materially changing the blood-pressure, but that under such circumstances there is necessarily implied an increased activity of the vascular nerve mechanism, hence a tendency toward exhaustion and shock which cannot be as well withstood as in those having a lower pressure but who have lost no blood.

Crile and Dolley urge operating in a dry field, picking up all vessels as they bleed, or if possible before their division.

In operations on the face, neck, and head temporary occlusion of the large arteries by means of a special clamp has been applied 61 times among 680 operations in this region, nor have any ill results been noted. In several instances both common cartoids were closed without alarming symptoms.

In operations on the oral cavity, such as cleft palate, excision of the tongue, jaw, etc., the anesthetic is given by means of rubber tubes passed through the nares. The technique is described by McHenry as follows: The patient is completely anesthetized, the pharynx is cleansed by means of a small gauze sponge held in a pair of forceps, and is then cocainized with a 10-per-cent solution. A drainage-tube as large as can be introduced, cut on the bias and fenestrated near the end, is passed through each nostril as far back as the glottis. The mouth is widely opened, the tongue is drawn well forward and out. With one good-sized gauze sponge the entire pharynx is then well packed while making traction on the tongue, as far back as the tubes. This forms an air chamber or space by means of which the tubes and larynx communicate. The tubes are cut at equal distances from the nose. The anesthetist listens carefully to ascertain if the patient is breathing through the tubes; if so they are joined by a Y-shaped glass tube, to which is attached, by means of another rubber tubing, a gauze-covered funnel. In the case of cleft palate and partial excision of the tongue the pharyngeal packing may be so arranged as to partially close the supplying arteries. Indeed, Crile states that there is no single procedure which has yielded such splendid results as the intubation of the pharynx in operations in the oral cavity.

In tumors of the neck in all suitable cases the carotid artery is temporarily closed. If there is an unusual risk of

hemorrhage, the patient is also encased in a rubber pneumatic suit and placed in a 45-degree upright posture. The arterial hemorrhage is to a large degree controlled, and in case of failure of the vasomotor center the rubber suit insures a safe amount of blood in circulation in the thorax and the brain by preventing its accumulation in the lower extremities and the abdomen.

As to secondary hemorrhage, measures are applied which most effectively prevent fatal anemia of the heart and brain. These measures Crile divides into two classes: (1) Therapeutic; (2) mechanical.

For the first morphine to give rest is of considerable importance; strychnine is advised as a stimulant, which should be used cautiously. Its effect is heightened by first raising the blood-pressure by infusion of saline. Digitalis, like strychnine, is least beneficial when most needed. If sufficient dosage be administered to affect the vasomotor system, the heart may be fatally overstimulated. Adrenalin remarkably affects the blood-pressure and is considered most important.

The danger of acute dilatation in the anemic heart must always be borne in mind. This is suggested by a large wave with but little resistance and a remarkably slow rhythm. It should also be borne in mind that excessive saline passes rapidly through the vessel walls, increasing the edema of the lungs and of the intestinal walls. Posture is of great value, associated with bandaging of the extremities and abdomen with heavy layers of cotton; still more so the application of the pneumatic rubber suit. Artificial heat is not objectionable provided it does not interfere with other means of treatment. In profound hemorrhage with great reduction in the number of red cells oxygen is considered of vital importance.

Crile holds out a still further prospect of advance in the treatment of hemorrhage to the effect that by performing end-to-end anastomosis between the artery of the donor and any vessel of the donee the lost blood, or a sufficient part of it, may be readily transferred. He states that this treatment seems to be absolutely effective even after the respiration and circulation have ceased. There is every reason to believe that both clinically and experimentally he has justified his confidence in this new method, and that he has devised an end-to-end technique for vessel anastomosis which is sufficiently easy and rapid of execution to make it applicable to the resuscitation of patients dying of hemorrhage.

ACUTE INFANTILE INTUSSUSCEPTION.

Contributions by Dunbar, McGregor, Marnoch, Greig, and Thyne appearing in the *Scottish Medical and Surgical Journal* for August, 1906, constitute valuable additions to the statistical and clinical knowledge of the affection, long considered rare because it was not recognized, but now known to be the cause of over three-fourths of the cases of acute intestinal obstruction in early life.

Dunbar has a record of 59 acute cases in the Royal Hospital for Sick Children in Edinburgh since 1898. Over 54 per cent died. The majority of cases occurred in healthy infants between the fourth and the twelfth month.

In strict accordance with published experience from many sources the successful results were in those cases in which early diagnosis had justified timely operation.

Dunbar states that the symptoms are remarkably constant and characteristic. The onset is sudden at times following a period of gastrointestinal disturbance, often in the entire absence of this. There is severe pain, evidenced by screaming, kicking, and drawing up the legs. This is subject to remissions and exacerbations quite independent of any obvious cause. During the intervals, which may last a few minutes, or exceptionally a few hours, the infant sleeps or is quiet. The pain is very shortly followed by vomiting, which is violent, and repeated until the stomach is empty. Thereafter it may not be a conspicuous symptom unless food is given.

The passage of blood-stained mucus from the bowel Dunbar regards as constant, as it was absent in only 3 of 59 cases. In this opinion Greig does not coincide. He believes that this symptom is neither constant nor early, and he who waits for it as the pathognomonic sign may also give away the chances of the child's life by his delay. Constipation, which is usually considered a character-

istic symptom, is often absent in the early stages, and diarrhea may be noted, due to the violent peristalsis set up by the intussusception, which empties the bowel below the seat of obstruction. The general condition of the patient is the most characteristic of all symptoms, though this should be diagnosed before collapse is obvious, when a fatal termination is likely to occur whether treatment be adopted or not.

Dunbar advises that the physician give due weight to the statements of the mother in regard to the baby's condition, since she is best able to judge of the extent of the collapse, observing that "she who knows so well what the child's demeanor is in health will usually be found to be correct if she states that he is 'awfully felled' or 'very ill.'" The symptoms may be misleading, since in the intervals of pain the child seems to rest naturally. In the later stages it is even preternaturally quiet, the pallid face, sunken eyes, rapid pulse, and erratic temperature all being characteristic of a condition which should have been diagnosed early. There is usually but moderate distention, sometimes asymmetry. Palpation generally causes great pain and is resisted by rigid muscles, hence for its proper conduction requires an anesthetic. Tumor in the early stage can always be felt if an examination be carefully conducted, and constitutes the most valuable sign in physical examination. In Dunbar's experience the tumor has felt like a simple rounded projection on rectal palpation in nearly half the cases.

Greig states that in no early case has he failed to find the tumor. He holds that prolonged, recurring colic, not yielding to ordinary treatment, in itself justifies the administration of an anesthetic to the child and palpation of the abdomen in search of the tumor. With this opinion Dunbar coincides. Chloroform is the anesthetic of choice, since infants readily take this and go under with a very small dose.

Differential diagnosis must be made from enterocolitis, rectal polyps, and purpura hemorrhagica. Organic liver disease sometimes causes discharge of blood from the bowel, which has suggested the diagnosis of intussusception.

Dunbar holds that spontaneous recovery should never be expected; that once the diagnosis is made it is quite certain the infant will be dead in the course of hours or days unless treatment be instituted. He holds that immediate laparotomy is the only method of treatment which can give satisfactory results in a large number of cases.

McGregor tabulates 123 cases of intussusception, containing all those treated in the Glasgow Royal Infirmary and Hospital for Sick Children since 1893. The first table comprises those which occurred during the ten years between 1893 and 1903; the second table deals with the cases during the last three years, from April, 1903, to April, 1906. The total number in each series is almost the same. The sudden increase in number is to be attributed to the greater attention given to the affection and the frequency with which it is now recognized. There is distinct lowering of the mortality in the second series of cases. The total mortality of these cases is 63 per cent, compared with a mortality of 27.5 per cent for strangulated hernia. Observation shows that cases treated within twenty-four hours of the onset give recoveries in 63 per cent.

Marnoch of the Aberdeen Royal Infirmary records eight cases, one of which recovered by the spontaneous extrusion of the slough. Of the remaining cases, all subject to operation, four recovered.

Greig records 20 cases, but does not absolutely reject manipulation, alone or combined with inversion with or without inflation. His table begins with four cases, all treated by inflation, manipulation, and inversion, and all terminating in recovery. Of the remaining cases subjected to operation, all but one recovered.

A general practitioner voiced the sentiment, which is perhaps still general, that intussusception in the experience of the individual is a rare disorder. Also he expresses his opinion, now fortunately becoming universal, that the only treatment worth considering is immediate laparotomy.

The history of intussusception accentuates the fact too little recognized that an infant does not exhibit recurring or constant symptoms of severe pain without adequate cause.

In so far as it is a common affection of infancy amenable to surgical treatment, but attended by a high mortality because

it is not generally recognized, acute otitis media and its brain complications can be classed with intussusception. Each has a fulminant beginning, a distinct and striking symptomatology, and a fatal termination, attested by the numerous certificates giving as causes of death meningitis, or peritonitis, or intestinal obstruction.

Reports on Therapeutic Progress

THE THERAPEUTIC VALUE OF ANTITHYROIDIN IN THE TREATMENT OF EXOPHTHALMIC GOITRE AND KINDRED AFFECTIONS —A PRELIMINARY REPORT.

The *New York State Journal of Medicine* for June, 1906, contains an article by ELSNER and WISEMAN, in which they reach the following conclusions:

1. In all of their cases blood-pressure study proved the disease to be one in which, despite the small and thready pulse, the sphygmomanometer showed high pressure. With an improvement in the tone and character of the pulse under treatment the measure of the blood-pressure showed no appreciable reduction.

2. In considering the efficacy of antithyroidin it must be remembered that the profession has of late years given a much more favorable prognosis than formerly in exophthalmic goitre, that both typical and atypical cases show a marked tendency to remission with comparative comfort during many years, and that acute exacerbations of symptoms are not infrequent.

Dr. Willy Meyer, of New York, who has had some experience with antithyroidin, in a letter recently received, says:

"I will say this much, however, that I was greatly pleased and surprised at the results obtained with the drug. In both patients many of the symptoms were markedly improved, especially the tachycardia and the pronounced tremor. Less influenced by the treatment was the size of the gland, and still less, if at all, the exophthalmos. However, both patients were so much pleased with the effect of the treatment that they did not feel like having an operation added, that might perhaps have improved also the exophthalmos.

"Personally I shall certainly continue the use of antithyroidin, and consider it clearly indicated in those seemingly almost hopeless cases with fever and such debility that prompt operation is out of the question. I am sure that many a case may be tided over by the treatment until such time that surgical help may be suggested, if necessary."

3. The writers are positive that antithyroidin is a remedy which can be used for the relief of the annoying and alarming symptoms of exophthalmic goitre in typical and atypical cases. The greatest improvement is found in the relief of the tachycardia, precordial distress, and tremor. This improvement is hastened by rest in bed and close attention to diet. Rest in bed and diet alone, without the administration of antithyroidin, will not lead to the same degree of cardiac comfort.

4. Improvement of one or more of the symptoms of the disease is likely to follow within from three to seven days after beginning the use of the remedy. If there is no improvement of symptoms after from three to four weeks of administration, the chances are against ultimate benefit from the prolonged use of the serum. In serious cases it will be necessary to continue the treatment during many months. In all cases after the disappearance of the subjective symptoms, it will be wise to administer antithyroidin during periods varying from four to eight weeks at intervals of two or three months.

5. Cases without marked goitre with slight exophthalmos, tremor, and the Graefe symptom have yielded most readily to the antithyroidin treatment. The enlarged thyroid has become perceptibly smaller, but has not returned to the normal size.

6. Exophthalmos, in their experience, continues to be the most rebellious symptom, never yielding entirely to antithyroidin treatment.

7. Nervous symptoms usually yield as the heart becomes slower. The many fears which take possession of these patients are also relieved at the same time.

8. The majority of their patients have increased in weight. Patients who have taken antithyroidin during a long period feel when the serum is discontinued as if they had been robbed of a food to which they are entitled, and return to its use with confidence and pleasure. This state-

ment they have received from a number of their patients while preparing this paper, in answer to inquiry as to their present condition. One of their typical cases has taken in the neighborhood of forty bottles of the serum.

9. In no case have they had occasion to regret the trial of antithyroidin. It has always proved itself harmless. It may be given during pregnancy without fear of injuring the mother or fetus. Hypertrophied and dilated hearts offer no contraindication to its administration.

The authors have been in the habit of administering the serum night and morning in doses of from fifteen to thirty minims. In mild cases the initial dose was from ten to fifteen minims. The serum may be given in raspberry syrup, may be taken in water or the elixir of orange peel. The Germans prefer a mild wine as a vehicle for its administration. In most of their cases, after having administered the serum during several weeks, they have discontinued its use for a day or two at a time.

In patients who show no benefit from the smaller doses, they have increased the dose, occasionally giving from forty to sixty minims. They have never used the remedy hypodermically.

Clinical experience argues against permanence of cure in chronic cases at the present time. The number of cases observed is too small to justify definite statements.

Sidney Kuh, of Chicago, reports the case of a woman who has been without serum for two and one-half years and continues in excellent health.

Hempel speaks of a woman who, for four months after the discontinuation of treatment, was able to take long walks and even climb mountains without experiencing palpitation.

With Leyden, Moebius, and some of the best-known clinicians of Germany enthusiastic in their praises of the therapeutic value of antithyroidin, Durig speaking of its effect as "eklatant," the writers feel justified at least in giving the serum a thorough trial, postponing their final judgment, however, until a sufficient time has elapsed to reach conclusions after a large number of cases have been treated. Let those who use the remedy publish their results and experiences.

The experiences of the authors and those of others included in their record encourage them to look with hopeful anticipation to the future, and in believing that the treatment with any of the antithyroids is not an ephemeral suggestion, and that it may ultimately prove to be a rational therapeutic method. At present they can only admit its value in relieving symptoms, and are satisfied that its administration is not followed by injurious results.

THE DIAGNOSIS AND TREATMENT OF TYPHOID PERFORATION.

The mortality of typhoid fever has been reduced by virtue of the possibility of certain diagnosis and by the improvement in the medical treatment. About one-third of the mortality of the disease now is from perforation. In the army in 1898 the statistics, which were based upon autopsy findings, showed that perforation was the cause of more than fifty per cent of the mortality. It is possible that the estimate for civil life is too low. However, upon this basis about 25,000 persons die annually from typhoid perforation, of which number Woolsey claims that over 6000 might be saved by prompt operation. This author regards early diagnosis, with a correspondingly early operation, as the important factor in the reduction of the mortality.

The tables of Harte and Ashhurst show that the cases operated upon thirty-six hours after the perforation gave a lower mortality than those operated upon at an earlier period; and this Woolsey attributes to the fact that patients who have survived thirty-six hours have a milder infection, or the process has been slow enough to permit a combative reaction or a limitation of the process. He has collected from the reports of the Presbyterian Hospital and from his own experience seventeen cases operated upon, and argues for Osler's dictum, that what is needed is a fuller knowledge of the immediate symptoms of perforation as distinguished from those of the subsequent peritonitis, which is what is usually diagnosed. The average period at which perforation occurred in his cases was the twenty-seventh day of the disease. He has found only one symptom which was nearly always present, and that is abdominal pain, usually coming on suddenly

and generally severe. This pain is usually in the lower half of the abdomen, and mostly in the right side. This has been the general experience of other observers, the lower three feet of the ileum being the usual site of perforation. A certain degree of general depression, as indicated by increase of pulse rate, is commonly present. After this the symptoms become those of peritonitis—tenderness, increase of polynuclear leucocytes, distention, constipation, vomiting, rigidity, inhibition of diaphragmatic respiration, rise of temperature, increase of pulse rate and respiration rate. These may be present in part or in whole. The growing conviction among surgeons is that sudden and severe pain, especially in the lower part of the abdomen, in a typhoid patient in the fourth or third week, especially if associated with rigidity and tenderness, should call for operation. The strongest probability is that a perforating ulcer will be found, and found at the time when its surgical treatment promises the best result. If the cause of the symptoms is not perforation, as might rarely be the case, some other surgical condition may be discovered, or if not the slight harm that is done the patient is fully compensated for by the advantages accruing to the cases whose perforations are discovered early as a result of this policy.—*New York State Journal of Medicine,* June, 1906.

TREATMENT OF AMEBIC ABSCESS OF LIVER.

In the *British Medical Journal* of June 16, 1906, ROGERS and WILSON remind us that nearly four years ago, in a paper read before the British Medical Association, Rogers showed that living amebæ can be found in the walls of every case of tropical abscess of the liver examined at the time of or shortly after operation, as well as post mortem, if they have not been previously drained for some days, and at the meeting of the association last year he confirmed that statement after much further experience, and also illustrated the great value of the presence of leucocytosis in assisting the early diagnosis of the disease. Moreover, in the first paper he showed that two-thirds of tropical abscesses of the liver seen in Calcutta are free from staphylococci and bacteria when first seen, even in the late stage of the disease so commonly met with in native patients, while as a matter of fact in nearly half of the remaining cases but one or two colonies of cocci were obtained on culture, which were probably accidental contaminations, or at least played no part in the causation of the disease, an opinion which is borne out by the fact that in one case the liver abscess was cured by aspiration and quinine injection in spite of a very small number of colonies of staphylococcus albus being cultivated from the aspirated pus. Moreover, he then also recorded the fact that he had found the active amebæ in the wall of a liver abscess could be killed with great rapidity and certainty by weak solutions of quinine, and that when such solutions are used for washing out liver abscess cavities, which are discharging thick pus swarming with amebæ, these parasites very rapidly disappear, and the discharge becomes much less copious and almost serous in character, as long as it remains free from septic cocci.

Having thus found that amebic abscess of the liver is in the great majority of the cases free from organisms of a bacterial nature, while the constantly present ameba is readily killed by weak solutions of quinine, while it is well known that this class of abscess does sometimes encyst and dry up of itself, he suggested in July, 1906, that it would be a rational procedure, in cases diagnosed early, to draw off as much pus as possible by aspiration and to inject quinine solution into the cavity, and then to withdraw the needle and watch the result, the pus being examined bacteriologically to ascertain if it is free from staphylococci or other bacteria; and he concluded the paper with the remark that "this method is about to be tried in Calcutta, and hopes before long to be able to report on it." So far as known, no cases in which this method has been given a trial have yet been published, possibly owing to his not having hitherto been able to fulfil his promise to record the results of the use of the method, on account of having had no cases under his own treatment, while he has met with unexpected difficulties in persuading surgeons to give this treatment a trial. The usual objection raised is that his method is a violation of the principle that an abscess in any position and of any kind must be opened and drained. The facts

that at least two-thirds of amebic abscesses of the liver are quite free from ordinary pus-forming bacteria, and that even in the case of tuberculous abscesses withdrawing the pus and injecting iodoform is sometimes successful, while the ameba of liver abscess is much more rapidly killed by quinine than the tubercle bacillus by iodoform, are arguments which usually fail to modify the force of this surgical canon.

In his former paper he mentioned that he had found both the neutral bisulphate of quinine and also the ordinary sulphate (1 grain dissolved in 1 minim of dilute mineral acid) efficient in killing the ameba, and he suggested the use of the latter for injection into liver abscesses with the idea that it would be less readily absorbed than the soluble salt, and this form was used in Major Maynard's case. On further consideration he has come to the conclusion that the ordinary sulphate of quinine would be liable to be precipitated and rendered inert in the alkaline serous fluid in the abscess cavity, and in the two cases which he reports the soluble bihydrochlorate of quinine was injected with such perfect success that he now recommends its exclusive use for this purpose. With regard to the strength and quantity to be injected, he usually has two solutions made up and sterilized before the operation, each containing 30 grains of the bihydrochlorate of quinine, but in one this amount is dissolved in 2 ounces of water and in the other in 4 ounces, the former being used if the abscess contains less than 10 ounces of pus, and the latter if it is larger. In this way the dose of quinine is limited to 30 grains, but in the case of larger abscesses it is dissolved in more water, so as to bring the drug into contact with all parts of the cavity. In the second case Captain Wilson injected 50 grains of quinine, but the patient suffered from severe dizziness on coming round from the chloroform, so it is advisable at present not to use more than 30 grains, which appears to be sufficient in practice.

An objection which might be raised to considering the quinine injection as the cause of the rapid cure of these two cases of liver abscess is the possibility that aspiration alone would have been equally successful, as is occasionally the case in tropical abscess of the liver. Apart from the extreme unlikelihood of two successive cases being so rapidly cured by aspiration alone, Rogers points out that the first case was a very acute one with remittent fever, which it is very difficult to conceive as likely to be immediately cured by a single aspiration. Nevertheless, further cases will be necessary to establish this method of treatment and to work out its exact indications, but as Captain Wilson will not be able to treat further cases for some time, it has seemed to these writers advisable to place these two cases on record to give him due credit for first successfully trying such a novel proceeding as the method suggested.

THE TREATMENT OF RINGWORM.

The visit of Dr. Sabouraud to England and his address to the Dermatological Society of Great Britain and Ireland arouse fresh interest in the rapid development which has taken place within the last few years in the treatment of ringworm by the Roentgen rays. Ringworm is a very ancient disease; it is found among the Arabs and among uncivilized peoples. It is to-day wide-spread among the poorer and less cleanly classes, but the fact of its comparative rarity among the better classes points to its being a preventable disease. The cure of ringworm has always presented the greatest difficulty because the root of the hair is inaccessible to external antiseptics, and because no remedy could be found which would penetrate to the hair papilla without causing at the same time its destruction and therefore permanent baldness. The average duration of the disease extends from two to four years, during all of which time the child is deprived of school teaching at a particularly receptive age.

In 1896 Dr. Sabouraud sought to find an agent capable of suspending for a time the function of the hair papilla. He made experimental inoculations of a microbic toxin, but the resulting alopecia usually occurred at a distance from the site of inoculation. An ointment of acetate of thallium caused a general alopecia, followed by healthy regrowth of hair, but in some cases grave constitutional symptoms arose which necessitated the abandonment of the method. Cataphoresis with various substances is still on its trial

and has its advocates. Roentgen rays were employed for depilation for several years by many workers with successful results, but in all recorded cases repeated exposures of the same area were required, and the danger of permanent baldness and *x*-ray dermatitis was too great for general adoption of the method.

Dr. Sabouraud turned his attention to the *x*-rays as a means of suspension of the function without destruction of the hair papilla at a single sitting. At the outset of his researches he was met with the varying length of time of exposure said to be necessary to insure depilation. Freund wrote in 1904 that an exposure of from eleven to twenty hours was necessary. The number of sittings needed for depilation of each patch varied in the different records from five to twenty and even more. Some observers advised long, and others short, exposures; some counseled the use of hard, and others of soft, tubes. The distance of the tube from the scalp and the frequency of exposures necessary also varied widely; and to add to the complexity of the subject many workers found that in spite of every care cases of radiodermatitis and permanent alopecia supervened. It appeared to Dr. Sabouraud that the essential factor in the situation was the discovery of a method by which the quantity of *x*-rays emitted from the Crookes tube could be easily and accurately measured, so that for each patch treated one single application of *x*-rays might be sufficient for a cure.

As previously explained in the columns of the *Lancet*, Dr. Sabouraud and his assistant, Dr. Noiré, measure the quantity of *x*-rays emitted by the alteration in the color effected by the action of the rays upon a disk of platinocyanide of barium. When the disk, exposed at a certain precise distance from the Crookes tube, acquires "Teinte B," a fawn tint which is compared with the pattern supplied with each packet sold, the exposure must be at once stopped. Since the introduction of these disks, or pastilles, as they are usually termed, there have been from time to time complaints from physicians who have not had the expected success after their use. Dr. Sabouraud now points out in the address referred to that such failures may be due to several causes: for instance, the pastille may have been placed in the wrong position or may have been exposed to daylight while the *x*-rays were being employed, the head of the patient may have been inaccurately placed, the Crookes tube may have been too large, or the pastilles may have been wrongly made. The pastilles must be situated precisely 7½ centimeters from the anticathode, and the patch to be treated must be precisely 15 centimeters from the center of the anticathode. If the pastille is placed further off it is obvious that a radiodermatitis will be caused if the exposure is not stopped until the pastille acquires the correct tint. On the other hand, if the pastille is placed nearer to the anticathode than the 7½ centimeters Tint B will be acquired too soon, and the hair will not completely fall out. Mathematical precision in arranging the centering of the rays and the distance of both pastille and scalp is indispensable for success. Some experience is required exactly to gauge the tint with the pattern, and we believe that failures are possibly due to overcaution as well as to recklessness and perhaps defective color vision on the part of the physician. Dr. Sabouraud points out how deputy nurses make mistakes and how experienced nurses become so expert that they can gauge the tint even when the pastille is lying in the patch of the active rays—an ability to which he himself cannot yet lay claim. Certain German makers have recently sold pastilles of platinocyanide of barium, but instead of making up the emulsion in collodion with acetate of starch they have used gum arabic and varnished the pastille surface; such pastilles cannot be guaranteed, and failures due to their use have been reported. Lastly, Dr. Sabouraud emphasizes the importance of employing a Crookes tube the diameter of which does not exceed eight centimeters and the glass of which is thin.

These sources of error have been briefly mentioned, but the chief refutation of adverse criticism of the pastille is the experience of Dr. Sabouraud at the Ecole Lailler. In 1500 cases treated with 7000 exposures since 1904 not a single case of dermatitis has occurred. The financial results in the city of Paris have been sufficiently remarkable. The cases admitted to hospital have diminished in number and their detention has decreased from twenty-seven months, the average time required for cure by the older methods,

to six weeks. The cost of a patient suffering from ringworm in hospital to the Administration de l'Assistance Publique is 2.80 francs per day. With the new method of treatment the accommodation for such cases is found to be larger than necessary.

In January, 1904, Dr. Sabouraud was able to give up to the Assistance Publique 150 beds, and as a bed represents a capital of 10,000 francs, 1,500,000 francs were saved. In another six months Dr. Sabouraud expects to be able to hand over another 100 beds. Up to 1903 children affected with ringworm lived at the Ecole Lailler for an average of two years, and the average of cures per annum was 110; in 1905 the number of cures was 504. Each cure used to cost 2000 francs; now it costs an average of 260 francs. Dr. Sabouraud made the following summary at the conclusion of his address: "With the application of *x*-rays for ringworm the Assistance Publique will have recovered at the end of this year a capital of 2,500,000 francs; and further, it makes now, and will continue to make, a saving certainly exceeding 300,000 francs per annum, a sum which will increase from year to year."—*Lancet,* June 16, 1906.

OVARIAN GRAFTING.

The distressing results which so often follow the complete removal of the ovaries are at times so marked that it is not surprising that a number of experiments have been carried out by various observers in an attempt to transplant successfully these organs from one animal to another. The results obtained have, on the whole, been encouraging, but up to quite recently no case had been recorded in which this operation had been so successful as to be followed by pregnancy in the human female.

In the *Lancet* of June 16, 1906, a most interesting case is recorded by one of its American correspondents, in which Dr. Robert T. Morris transplanted portions of ovary from one patient to another, with the result that the latter became pregnant. Both ovaries were removed by him for cirrhosis with a Tuffier's angiotribe from a patient twenty-one years of age. Ovarian grafts taken from a woman, the mother of three children, who was suffering from prolapse of the uterus, were implanted in the broad ligament on either side in slits in the peritoneum. The patient made a good recovery; four months after the grafting menstruation occurred, once again six months later, and then regularly. The operation was performed on February 11, 1902, and on March 15, 1906, the woman was delivered of a child weighing seven and a half pounds. This is the first case of conception that Dr. Morris has met with in the 14 cases of ovarian grafting which he has performed. Such a case is, of course, always open to the criticism that the ovaries were not completely removed at the first operation, but every care seems to have been taken to insure this.

The success which has attended this operation in animals renders the possibility of pregnancy occurring in the human subject after implantation of a portion of an ovary of another person by no means so improbable as it might appear to be at first sight. As long ago as 1896 E. Knauer showed that ovaries could be completely severed from their normal surroundings and successfully transplanted either to an adjacent part of the broad ligament or even to some distant part of the body, such as the abdominal wall, and yet would continue to grow and to produce abundant Graafian follicles. His observations have been confirmed by numerous other experimenters, who have proved not only that the ovaries of one animal can be transplanted into another animal of the same species, but that they can also be successfully engrafted into the body of an animal of another species, as, for example, from the dog to the rabbit. It appears, however, that whilst in the former case the ovaries continue to live and produce Graafian follicles and even mature ova so that it is possible that pregnancy might follow, when the transplantation takes place from one species to another the engrafted organ tends to atrophy and eventually to disappear. Indeed, some observers—as, for example, Arendt—contend that this occurs in all cases sooner or later, and that the transplanted organs never retain their normal functions for any length of time. The experimental evidence, however, so far published seems to show that we may anticipate results in the future not less successful than that obtained by Dr. Morris from this mode of treatment, and that we may hope in this

way to relieve some of the distressing symptoms of the artificial or even the natural menopause, and to remove the unfortunate sequel of sterility from cases in which removal of both ovaries is called for in young women.—*Lancet,* June 16, 1906.

THE TREATMENT OF PRURITUS.

In the course of an article on this subject in the *Clinical Journal* of June 13, 1906, ADAMSON tells us that the diagnosis of the cause of the pruritus is the first step toward its treatment. When the cause cannot be discovered and removed, the prognosis is bad. In all those cases in which the pruritus is associated with a disease of the skin an important part of the treatment is to prevent the irritation of the skin by the scratching which the pruritus induces, since such irritation generally tends to aggravate the disease and to prevent its cure. Hence the great value of protective applications in eczema, and of antipruritic applications in urticaria and in lichen planus or prurigo. Some writers advise the administration of narcotics, and in cases of infantile eczema chloral may be given at bedtime in doses of fifteen to twenty minims of the syrup to a child of six months, or half a drachm to a child of one to two years. In older persons bromides are better and safer than chloral. Opium should seldom be given, as it usually tends to aggravate the itching. Such drugs are, however, not often required if proper precautions be taken to protect the eczematous areas from irritation by exposure, by clothing, and by scratching.

In pruritus due to scabies appropriate treatment for the affection usually quickly gets rid of the itching, or if it persists after the cure of the scabies a mild tar lotion is effectual in removing it.

Senile pruritus is sometimes relieved or even cured by the avoidance of alcohol or by the removal of pediculi, and an excellent and cleanly method of treating pediculosis of the body is that of making the patients wear a piece of sulphur in a small muslin bag slung from the neck. Those cases of senile pruritus to which no cause can be assigned beyond the atrophy of the skin are of much less favorable prognosis; many of them can be relieved by an empirical remedy, viz., cannabis indica, beginning with five minims of the tincture three times a day and increasing to twenty or thirty minims for each dose. It must be well diluted and taken after meals.

In pruritus dependent upon disturbance of the digestive functions the bowels must be regulated, and careful attention given to the diet, alcohol being avoided, and any particular kind of food which has been found to disagree.

In pruritus of diabetes, of albuminuria, and of cardiac disease, these diseases must, of course, receive the first attention. Cardiac cases are often relieved by small doses of digitalis. Winter pruritus will often cease on stopping the cold morning bath and adopting a warmer form of clothing. In many cases of pruritus cod-liver oil internally is useful in improving the general condition of the skin.

As empirical remedies in obstinate cases, or in cases in which the trouble is due to organic disease, or as temporary measures in all cases, one of the following drugs may be chosen: quinine in large doses, antipyrin or phenacetine in doses of 10 grains and gradually increased.

In intractable forms of pruritus injections of pilocarpine are often of great service. In senile pruritus especially the injections may be continued for weeks or months, and then seem to do permanent good, possibly by increasing the nutrition of the skin by constant dilatation of the capillaries. The immediate effect in allaying irritation is probably due to the sweating induced, which relieves dryness of the skin. The most satisfactory method of employing this drug is as follows: the patient takes a warm bath in the evening just before going to bed; a hot drink is now given, and an injection of pilocarpine gr. 1/10 to 1/15; profuse sweating occurs, and the patient gets several hours' sleep, just at the time when the itching is most troublesome. This proceeding may be repeated nightly for weeks, and sometimes leads to the permanent cure of the pruritus.

In all cases local applications are useful, and the list of such applications is almost endless. Among the most useful are those of the disinfecting type, liquor carbonis detergens, carbolic acid, etc., of course suitably diluted. To the lotion may be added such powders as zinc oxide or calamine. In many cases cold applications are found to relieve, such as cold

sponging with vinegar and water, or with alcohol and ether, and afterward powdering with starch powder. Lotions may be conveniently applied by means of a spray. A lotion of perchloride of mercury, ½ to 3 grains to the ounce, is cleanly and odorless. Menthol 5 to 10 grains to dilute alcohol 1 ounce is a useful lotion.

In pruritus ani and in pruritus vulvæ the rational treatment is to remove the cause if possible. Fissure of the anus requires surgical treatment. The digestive organs are often at fault in pruritus ani, and treatment must be given in this direction. As temporary measures many local applications are of value: Calomel 1 drachm to 1 ounce will sometimes give immediate relief in pruritus ani. It is important to insist upon local cleanliness. In pruritus vulvæ relief may often be obtained by bathing the parts with a warm, freshly made, saturated solution of boric acid, and, after drying thoroughly, the free application of a simple zinc ointment, though of course here again local or reflex causes should be sought for and relieved if possible. We have now, too, in the *x*-rays a valuable remedy for obstinate cases of pruritus ani and pruritus vulvæ.

ATROPINE AND STRYCHNINE COMBINED, A SPECIFIC FOR SEASICKNESS.

GIRARD in the *Journal of the American Medical Association* of June 23, 1906, reports upon the value of this plan of treatment. At first he used atropine and strychnine in conjunction with caffeine, but after many trials abandoned the latter, because, given hypodermically (which is the safest and most expeditious method), it occasionally gave rise to local inflammation.

For many years he had believed that he was the original discoverer of this treatment, but it seems that other physicians have used it at times independent of his investigations, and he therefore does not pretend to absolute originality, but believes this report represents the views of many observers working under his instructions under various circumstances, and more than any individual views will establish the value of the treatment.

The author's observations show that in almost every instance a hypodermic injection of 1/120 of a grain of atropine sulphate (0.0005 mg.) with 1/60 of a grain of strychnine sulphate (0.001 mg.) is readily borne by adults, and as a rule causes no disagreeable sensation. This may be taken at the commencement of a voyage, or when the sea commences to be rough, or at the advent of a storm when the motion of the water causes nausea; this dose is at times not sufficient with persons refractory to the action of belladonna, and he has repeated it twice at hourly intervals before incipient dryness of the throat or disturbance of vision warned him that atropinism had been reached, when in every instance of his observation the symptoms of seasickness disappeared. Other observers found this dose in rare instances too great.

The advantage of hypodermic medication is the rapidity with which the effect is produced, and the certainty that no accumulating action need be feared, as is the case when the remedy is taken per os—perhaps too late to prevent nausea —and possibly remaining in the stomach undissolved, without apparent effect, when it might be followed by a second dose, both operating together and acting in too severe a manner. This happened in an instance when he entrusted the remedy to a lady going from Manila to Hongkong. She encountered a sudden severe storm, and treated a number of her lady friends aboard with the uncertainty of medication by the mouth, and overdosed them so as to result in severe symptoms of atropinism.

As a rule, one dose is sufficient for a whole voyage, apparently overcoming the disturbance until the voyagers acquire their "sea-legs," but in a long trip with severe weather occasional doses are required to keep up the effect.

The rationale of the treatment may be found in the stimulating effect of the atropine on the circulation in the brain, while the strychnine causes a similar action through the spinal cord in the respiration.

The author has a few instances of his own observations and extracts of reports made by medical officers and patients. The general consensus of opinion is that the remedy is a specific. He is satisfied from his own observations that when it failed there must have been some complications, which he was always able to meet in his experiments.

On one of his ocean trips one of the passengers was a surgeon of the army

who had occupied a similar position in the navy, but had been compelled to resign because in any kind of weather on board ship he continually suffered from seasickness. The writer gave him one dose of the remedy when they left the harbor, and for safety's sake repeated it on two subsequent days, and this officer remained free from seasickness.

Another officer suffered from severe headache, and attributed it to "biliousness," without being benefited by any treatment. The author suggested seasickness as the cause, and by one dose of the remedy the illness was cured.

SOME ACID INTOXICATIONS.

To the *Clinical Journal* of June 13, 1906, BROWN contributes a paper on this subject. In summing up his remarks he arrives at the following conclusions:

1. Diacetic acid appears in the urine under clinical conditions which, though differing widely, have these points in common: (*a*) Relative starvation of the tissues; broadly, that they are being starved of carbohydrates, or, as in diabetes, are not able to use the carbohydrates presented to them. (*b*) Excessive disintegration of the fatty tissues in the body. Really these two conditions are often the same, for if the tissues are being starved the body attempts to live on its own fat. The rôle of the carbohydrate, in von Noorden's opinion, is to provide the tissues with oxygen, which it contains in relative abundance. In this connection the writer reminds his readers of the appearance of abnormal acids in a condition of simple oxygen starvation—*i.e.*, mountain sickness. Our first duty in acid intoxication, then, is to find out why the tissues are being starved and wherein the diet is at fault.

2. The simplest test, and the one that gives the most information, is the claret color given by the urine on the addition of perchloride of iron.

3. The further production of these bodies should be prevented as far as possible by cutting off fat in diet and by adding carbohydrate. In diabetes, levulose (fruit sugar) may be utilized up to 50 or 100 grammes a day, but according to von Noorden oatmeal gruel is as efficacious, and it is much cheaper and more easily obtained.

4. The toxic effects of these acids should be neutralized by administering bicarbonates freely, if necessary up to one ounce a day. It is the author's habit to give some of the alkali in the form of citrates, which may be given in 45-grain doses; if coma supervenes, intravenous, not subcutaneous, infusions of at least a pint of 1 to 2 per cent of bicarbonate of soda are indicated.

The author asks his readers to test these conclusions as opportunities may arise, as he believes that in acid intoxications we have the explanation of symptoms that would in many cases otherwise remain obscure.

INDICATIONS FOR TREATMENT IN ACUTE DISEASES OF THE ACCESSORY SINUSES.

In the *Yale Medical Journal* for May, 1906, SWAIN gives us his views as to this matter. He says that when a cold with simple mucopurulent discharge has left the lines of moderation and taken upon itself the broader sphere of activity when the sinuses become affected, it gives little warning as to the exact time when hostilities are about to be carried into the new territory. With every bad cold there is always a stuffy feeling about the head, pressure in the upper part of the nose, and mayhap headache. This, gradually in most cases, merges in the instances of frontal sinusitis into a brow-ache. The patient becomes conscious, to be sure sometimes suddenly, but more often gradually, as over night, that most of the ache is confined to the brow over one eye, sometimes unfortunately over both, with a feeling of weight and pressure and tenderness of that portion of the brow nearest the nose. When, therefore, there is one-sided mucopurulent discharge, or greater in quantity than from the other side, usually with more flow between the hours of nine and three, accompanied by distinct pain and tenderness on pressure on the under side of the brow at the root of the nose, it is time to ascertain definitely whether a frontal sinus involvement exists or not.

If one is the possessor of a frontal sinus lamp he may in the dark room readily make a diagnosis when one side only is involved, and he will find that even

when the lamp is not helpful in making a positive diagnosis because of the involvement of both sides making comparison impossible, he has an accurate gauge in the "dark lamp" as to when improvement begins and whether a final cure has resulted, for it is obvious that if the eyebrows were dark previously and later clear up, so that the cavity becomes transparent, dangerous pus no longer lurks within. Not possessing a transilluminator, a careful observation of the nose will generally discover the following points: Spraying out the nose with cocaine and suprarenal solutions to make it as open as possible, then cleansing it first by blowing and secondly by wiping out the middle meatus of the nose, one can frequently readily detect a stream of pus flowing down from the anterior part of the middle meatus toward the back of the nose, giving the assurance that the matter came from the frontal sinus region. Usually, also, the anterior end of the middle turbinate bone is swollen and club-shaped. In later cases one sees almost always granulation tissue at the anterior end of the middle turbinate, blocking the opening of the infundibulum, which is just above and behind the point of juncture of the middle turbinate with the side wall of the nose. Introducing a probe into the lower part of the infundibulum and gently producing a little backward and forward motion will frequently result in pumping down the fluid so directly from the frontal sinus that an absolute diagnosis is immediately established.

When the family physician in visiting a patient at his home has neither the transilluminator nor head mirror, and yet desires to make a diagnosis, he can make a very positive one if he simply recognizes in a one-sided case the objective symptoms that are in evidence, viz., to repeat, the one-sided discharge, usually more profuse at certain times of the day than at others, the existence during the time of the discharge of pain, which is of an excruciating type and directly confined to the forehead, and that the tenderness is mostly at the root of the nose on the under side of the eyebrow. If one seeks for tenderness along the edge of the eyebrow in the region toward its center, it is familiar to us all that we are pressing upon the supraorbital nerve and its branches, which may be, and in fact very frequently are, tender when there is nothing further than a simple cold in existence. Certainly continued repetition of these plain objective symptoms for more than one day should warrant the diagnosis of frontal sinusitis, and when once established the indications are clear that not only should the pain and tenderness and the direct symptoms referable to the confined pus in the frontal sinus be relieved, but the physician's responsibility must not cease until he has felt that he can absolutely guarantee that there is no longer any matter flowing from the frontal sinus. It is not the cases in which the symptoms are severe and pronounced that are really the most dangerous, nor is it at that stage when everything is swollen and turgid and distressingly severe that infection of the other sinuses most frequently takes place, but it is when the trouble is more or less in subsidence, where it has not been properly drained, and where there is day after day a slight dribbling discharge from this cavity, that infection of the other sinuses takes place.

Now what are the indications that the treatment has been of value? First and foremost, that it has relieved the pain. When we have established sufficiently good drainage for the pain to cease, and when it ceases after the treatment given the patient, it is fair to assume that what has been done has been of value. Pain the patient estimates; tenderness he also has to decide upon; what the physician should determine is that the matter has ceased to flow from the frontal sinus, that with his transilluminator the normal transparency of the mucous membrane lining the frontal sinus has again been restored to its usual healthy condition, and that the mucous membrane of the rest of the nose has assumed a normal or healthy appearance. His responsibility then ceases.

How are these results to be obtained? Partly by the patient's own efforts, and partly by the assistance of the physician. Once having established the diagnosis of the existence of frontal sinusitis, it is the attending physician's duty, who is responsible for the case, to see to it that as long as pain and pressure and tenderness exist the patient is daily seen, and if necessary

daily probed. Spraying out the nose with mild cocaine (2-per-cent) and suprarenal (1:5000) solutions, the applying of a pledget of cotton wet with a 10-per-cent solution of cocaine to the entrance of the infundibulum, by reducing the swelling as well as benumbing the parts, render the probing of the frontal sinus often perfectly easy and usually painless. The probe of a proper curve should be, if possible, passed away into the frontal sinus cavity itself. When this is impossible, careful scrutiny of the parts should be made to see if granulation tissue, which so often exists in the nose in that region where pus has poured over the membrane even for only a few days, does not interfere with the probing. It will also block the outlet, rendering free discharge impossible. When repeated efforts carefully carried out by competent hands fail to make it possible to probe the sinus, it is perfectly proper to remove the anterior end of the middle turbinate in order to accomplish a satisfactory entrance and the establishment of free drainage from the frontal sinus. It is always well to bear in mind that it is not necessary to remove a very large piece of the frontal end of the middle turbinate, and that the future of the patient is more comfortable when it comes to cleansing his nose by blowing if we confine our efforts to a conservative removal. The patient should be requested to keep his nose as clean as possible, by spraying and gentle blowing.

Obviously from what has been said the blowing of the nose when it is stopped up tight is to be discouraged rather than to be encouraged. It is better to snuff things back into the throat if possible, and then expectorate them, that motion producing greater suction upon the infundibulum and helping the process of discharge more than blowing. It is perfectly proper to use mild douching with physiologic saline or the Seiler's tablet solution, the hotter the better, in either of two ways: by allowing the solution to trickle back with the head bent backward directly down into the nasopharynx, drawing it through with mild suction, not even allowing it, as is sometimes advocated, to go around and out the other nostril, but having it go straight through and out the nasopharynx; or one can have a simple irrigator, and with the head bent forward allow the fluid to go in and out of the same nostril, not allowing it to go back into the nasopharynx at all. By douching out in this mild way with only force enough to carry the water up to the frontal sinus and back, or by spraying with hot saline from an ordinary atomizer, we frequently cause enough depletion of the parts to give a direct relief to the pain and pressure. Done by these methods the douching has not the attendant dangers of infecting other parts, including the middle ear. One can usually get assistance and help, after the simple douching, by spraying out with mild suprarenal solutions (1:8000 adrenalin), which take down the swelling and reduce the congestion, and the secretions can be softened and kept fluid by the insufflation of a small amount of boric acid after each cleansing. During the periods of pain these attentions of the patient to himself may be repeated as often as once in two hours, but in the interval not more than once in four or six hours. The indications which are for drainage and cleansing are thus carried out as well as possible. Usually such treatment will be perfectly successful if faithfully and accurately executed. When the frontal sinusitis refuses to yield to these measures, one may assume that he has a pocket, as the writer has recently had a case to illustrate, which may be more or less completely cut off from the main cavity of the frontal sinus, and which may be the cause of unremitting pain and tenderness—a rare condition, but one which it is well to remember may exist. When the discharge persists through weeks when there is a good opening, swabbing out with argyrol, 10 to 20 per cent, is of very great value. It lessens secretion without being irritating to the nose.

ON DEEP ALCOHOL INJECTIONS IN FACIAL AND OTHER NEURALGIAS AND IN HISTRIONIC SPASM.

The *Lancet* of June 9, 1906, contains an article by OSTWALT in which he states that he, for some years past, has made a special study of the treatment of facial neuralgia. His aim has been to find a therapeutic method by which a serious surgical operation might be avoided, even in very rebellious and chronic cases of tic-douloureux, the uncertainty of the final result being too great to warrant such

dangerous operations as those recommended in such cases. In some not too severe cases of supraorbital neuralgia he succeeded in relieving the patients by giving them once or twice daily, during a couple of weeks, local baths, lasting half an hour each, of superheated dry air by means of a special apparatus called by him "Thermaërophore." It was not until 1904 that he was put in possession of a method giving entirely satisfactory results in more than 90 per cent of all cases. The principle of the method alluded to depends in the main on the injection of nerve-destroying substances upon the nerve trunk, a treatment suggested for the first time in 1887 by Pitres and Vaillard and practically applied, since three or four years only, by Schlösser. He believes that he has improved upon this method in some essential points. We are now enabled to reach by our injections not only the third but also the second and first branches of the fifth nerve at the very point where they emerge from the apertures at the base of the skull. Consequently, the number of cases to be cured by these deep injections has considerably increased. The addition of cocaine or stovaine to the alcohol seems also to be a slight improvement.

The author proceeds in the following way: Supposing we have to deal with what he believes to be the most frequent condition in Fothergill's disease, neuralgia of the second and third divisions of the fifth nerve. He screws his bayonet-shaped needle on a syringe filled with about a fluidrachm of alcohol at 80 per cent, mixed with a sixth of a grain of cocaine or stovaine. After having previously disinfected the mouth and cocainized the mucous membrane at the point of the puncture he introduces his needle directly behind the alveolus of the wisdom tooth into the mucous membrane of the upper fornix of the vestibule of the affected side of the mouth, and passes it through the, here rather thick, submucous tissue. He then pushes the needle through the external pterygoid muscle or around its lower border until it touches the external pterygoid plate. Then he moves the needle in the zygomatic fossa slowly and carefully upward along the external pterygoid plate until it comes in contact with the infratemporal surface of the great wing of the sphenoid bone. Then he slides the point of the needle backward in the corner between this infratemporal surface and the before-mentioned external pterygoid plate as long as he feels the resistance of bone. As soon as this resistance ceases and the point of the needle encounters soft tissue, he has arrived at the foramen ovale. He then has to push the needle only a little (about a half to one line) further up in order to be sure that it touches the inferior maxillary nerve at the point of its emergence from the skull. He then injects very slowly, and with many interruptions, from one-third to two-thirds of a fluidrachm of his solution of cocaine or stovaine in alcohol, guiding the needle round about the foramen ovale and directing the jet of alcohol particularly toward those bundles which contain the nerve fibers supplying the affected parts of the head. The injection at the foramen ovale is soon followed by formication and torpor of the different branches of the inferior maxillary nerve, and if there has existed a neuralgic paroxysm before and at the beginning of the injection it is, as a rule, cut short by this latter. As soon as the injection in the third division of the fifth nerve has been terminated, he draws back the needle about a line, then slides it forward, always in contact with the bone, in the aforesaid corner between the infratemporal surface of the great wing of the sphenoid bone and the external pterygoid plate, until he feels that the bone resistance ceases here again. This is the case at the anterior and median, rather sharp border of the infratemporal surface of the great wing—*i.e.*, at the boundary line between the zygomatic and the sphenomaxillary fossa. The needle must now be pushed straight upward about as much as two and a half or three lines in order to meet the foramen rotundum and the trunk of the superior maxillary nerve coming out of this hole. After some practice one feels if in pushing it up one directs the body of the syringe very slightly forward in order to make the point of the needle slide backward on the anterior surface of the upper part of the pterygoid process—one then feels distinctly the small bridge of the bone that above separates the foramen rotundum from the sphenoidal fissure.

After having thus ascertained that the point of his needle is exactly where he

desires it to be, he very slowly and with many pauses injects again about one-third of a fluidrachm of alcohol upon the second division of the fifth nerve at its point of emergence from the skull. In the rather infrequent case of simultaneous neuralgia of the first and second or the first, second, and third divisions of the fifth nerve he only needs to push his needle, after the injection of the foramen rotundum, about a line more upward. He then reaches, after having passed over the afore-mentioned bridge of separating bone, the posterior lower end of the sphenoidal fissure, just at the place where the ophthalmic division of the fifth nerve passes from the middle cranial fossa to the orbit. A single puncture, followed by three successive injections, thus enables him to obtain a temporary incomplete paralysis of all the three divisions of the fifth nerve—*i.e.*, an anesthesia extending all over one side of the anterior half of the head from the vertex to the chin, including the nostril, the palate, and half the tongue. Even the masticatory muscles as a rule participate in this incomplete paralysis, to a certain degree at least.

The author has already treated a considerable number of cases of sciatica, often even of the most rebellious chronic kind. One, two, or three injections, as a rule, of alcohol solution made upon the trunk of the peroneal nerve (under the head of the fibula), or of the external saphenous nerve (at the calf), or upon the trunk of the sciatic nerve (at the thigh just underneath the gluteal fold, or, if that does not yet suffice, in the great sciatic notch) will cure the neuralgia, in the great majority of cases, very rapidly. As in the case of trigeminal injections, pain is generally relieved even during the injection, and it is in the same way replaced by a not painful sensation of formication and temporary torpor of the member. It may be stated in passing that sciatica caused mechanically by deep varicose veins is not to be cured by the alcohol injections. The author reminds us that before making the diagnosis of sciatica we ought to assure ourselves thoroughly that we have not to deal with an affection of the spinal cord. It is evident that in this latter case interference would be useless; the method would, however, do no harm in this case. Besides sciatica he has treated in the same way severe neuralgias of the anterior crural nerve, of the obturator nerve, of the external cutaneous nerve of the thigh, of the ulnar, of the cervical plexus, etc. Patients who had been unable to work for weeks and months in consequence of their neuralgia could often return to work some days after treatment. These deep alcoholic injections are therefore to be considered as a very valuable therapeutic progress. They ought to be strongly recommended, not only in facial but also in all other neuralgias, as well as in muscular cramp (histrionic spasm, etc.). This is why the author thinks it advisable to make the medical profession at once acquainted with his personal experience of the action of these injections.

ENDEMIC SPORADIC DYSENTERY (WITH SHIGA'S BACILLUS).

In the *British Medical Journal* of June 9, 1906, SAUNDBY writes on this topic, reporting his own experience. He thinks that the recognition of these cases is not difficult when our attention has been directed to them. It is not uncommon to find that the patient gives a history of several previous attacks of severe diarrhea. The stools are very frequently as many as twelve, seventeen, or even thirty in a day; this is so marked as to be characteristic of the disease, but there are evidently exceptions, as in a fatal case seen by Dr. Stanley, which had only two or three movements of the bowels daily. They are always liquid, and contain blood and mucus or pus. Under the microscope they may look as if composed entirely of pus. The cells in the cases examined by Dr. Hewetson were chiefly mononucleated mucous cells, and not true leucocytes; but Mott found that "the slime contained in the stools consisted almost entirely of polynuclear leucocytes and not of mucus," so that evidently there is sometimes pus present and at other times only mucus. The amount of blood varies, but may be at times quite considerable, evidently from the erosion of a blood-vessel. The reaction of the stools is often alkaline, but observations on this point are not sufficiently numerous to justify the conclusion that this is the rule.

Pain is not constantly present and is of varying character. It may be cramp-

like or colicky, or a general painfulness over the whole abdomen. It may occur only during, or after, defecation, or there may be tenesmus. It generally bears no relation to taking food. In one case pain made its first appearance when the disease had been already in existence for six months, and only about four weeks before the patient died. Too much importance has been attached to the presence of tenesmus, which is by some regarded as essential to the diagnosis of dysentery; this is unfortunate, as it leads to cases being overlooked or treated with less attention than they deserve during the stage in which they can be cured. Tenderness is common, especially in the latter stage, and may point to peritonitis.

Vomiting may be frequent or occasional, or altogether absent. The vomited matter may be the contents of the stomach or bile.

In some cases the tongue is generally described as dry and covered with a more or less thick brown fur. Gemmel writes of it as dry, red, and glazed in acute cases, but in asthenic and fatal cases as furred or covered with sticky mucus and dirty-brown crusts; no doubt most of the author's cases would come under the latter description.

The temperature, taken in the axilla, is in acute cases generally above normal —from 100° to 102°—but may be as high as 105° (Gemmel). Persistent high temperature is regarded by Gemmel as unfavorable. In chronic cases, or where there is collapse, or where death from exhaustion is approaching, the temperature may be normal or subnormal.

The pulse is usually over 100, but seldom reaches 120.

Perforation of the wall of the bowel by an ulcer has been the cause of death in most of the cases that have come under the writer's notice. In others death has been due to exhaustion from persistent hemorrhage and diarrhea. Recovery certainly takes place, but it is to be feared that in many instances it is incomplete.

In one case the patient gave a history of continuous diarrhea for six months, and in another for eleven weeks, but one that terminated fatally from perforation, with extensive ulceration of the colon, had only lasted three weeks.

In two of the writer's cases there is a history of one or more previous attacks.

The prognosis must be very guarded, and should be made to depend upon the influence of treatment.

The treatment the author has used is that recommended by Gemmel, whose practice in this disease has been extensive, and it has been successful in several cases since he adopted it, although unfortunately in many of these cases the anatomical condition of the bowel precludes hope of cure. It is important to send these cases to bed, and to keep them there until they are so far recovered that they can take ordinary food without any recurrence of the diarrhea.

Gemmel considers quinine the most valuable drug, given in one large dose of 15 to 20 grains, followed by smaller doses of 5 to 10 grains. He also gives calomel in a large dose of 15 to 20 grains, and irrigates the bowel with warm water or warm Condy's fluid. For diet he gives milk thickened with flour, beef tea, and mutton broth.

Fingland, in a short article on the treatment of dysentery, has referred to the value of a drug called hysteronica, the botanical source of which is *Haplopappus baylahuen*. The plant is indigenous to South America, and is used in Chili and the provinces of the west coast of South America as a specific for dysentery. A fluid extract has been made for him by Parke, Davis & Co., of which the dose is 20 minims, to be taken in milk or almond emulsions three times a day. He gives three cases of chronic sporadic dysentery in which it has been used with good results, but the author has had no experience with it.

SLEEP DISORDERS IN CHILDREN.

In the course of an article on this topic written for the *Birmingham Medical Review* for June, 1906, the contributor points out that of causes which have, with more or less confidence, been assigned as responsible for disturbed sleep, there may be mentioned first of all gastrointestinal disorder, because it is probably the most frequent. Even in adult life difficulty in getting to sleep, or very intermittent sleep, is a frequent result of the insinuation of some unaccustomed pabulum or some culinary backsliding. There is still plenty of injudiciousness in the feeding

of children, and where irregularity is ascertained or suspected, strict directions as to diet and the administration of the following draught at bedtime are often all that is needed to effect a cure:

℞ Sodii bicarb., gr. v;
Acidi hydrocyanici dil., min. j;
Sp. chloroformi, min. iv;
Aq. menth. pip., q. s. ad ʒij.

Worms in the intestine may possibly act as a cause of disturbed sleep, and if their presence is proved treatment for their expulsion should certainly be instituted. Phimosis, balanitis, vaginitis, are all irritating conditions which may interrupt sleep, and highly acid urine may act in the same way.

Night terrors may result from unsuspected bodily disease attended with pain. Thus examination may reveal hip-disease or calculus, carious teeth or ear trouble. Sweating at night may cause disturbing dreams, as also may insufficient bedclothes or slipping off of the bedclothes in the night. Too heavy bedclothes, or bedclothes too tightly tucked in, may cause disturbed sleep with sense of oppression or restraint, and hence, possibly, actual terrors.

Adenoids are another cause of uneasiness during sleep, and want of proper ventilation of the bedroom leading to deficient supply of oxygen acts in a similar way. Sometimes the patient's account of the dreams or sensations associated with the disturbance of sleep may help to guide us to a local lesion.

The foregoing may serve as examples of causes which, when found, point the way to successful treatment. Their removal, in the case of children whose power to sleep is otherwise unimpaired, puts an end to the matter.

Things are not so simple, however, in the so-called idiopathic cases, in which the capacity to sleep has been impaired by causes of long duration. In these the thorough examination of the child must be supplemented by a careful inquiry into the whole history of the childhood and minute investigation into the patient's environment.

Chronic dyspepsia, most often with constipation, will here again be the most common finding, and whether the dyspepsia is regarded as a neurosis, or the neurotic condition is largely due to the dyspepsia, the first step toward improvement must be the treatment of the dyspepsia. Regulation of the diet and a simple mixture, continued for a considerable time, are indicated:

℞ Sodii bicarb., gr. vj;
Tinct. nucis vom., min. ij;
Sp. chloroformi, min. iv;
Aq. menth. pip., q. s. ad f3ij.

This may be given a quarter of an hour before meals. Constipation, if present, is best treated by a draught containing fluid extract of cascara and tincture of belladonna given at bedtime.

When dyspepsia and constipation have been relieved, or where they have not occurred, a cod-liver oil emulsion with syrup of iron phosphate may be given if nutrition is bad; in other cases, and where the oil is not well taken, glycerophosphates may be used.

SHOULD THE SALE OF CARBOLIC ACID BE RESTRICTED?

The *Bulletin of Pharmacy* for June, 1906, discusses this question in an interesting editorial. It believes that the conviction has steadily grown during recent years that severe restrictions should be made to surround the sale of carbolic acid. This substance is used to a far greater extent for suicidal purposes than any other poison, despite the horrible and painful death which it provokes. Addison Dimmit, in a paper read last year before the Kentucky Pharmaceutical Association, gave some suicide statistics showing that during 1904 in New York City carbolic acid had been employed by 293 out of 853 persons, in Chicago by 170 out of 459 persons, and in New Orleans by 23 out of 86 persons.

Figures even more impressive than these have been published in the *Bulletin of Pharmacy* from time to time, and it is probably well within the truth to say that carbolic acid is used more than twice as often as any other single poison by persons desiring to commit suicide.

The frequency with which the acid is used, and the alarming number of cases brought annually before the Boards of Health in all the large cities, have led to the enactment of anticarbolic acid ordinances in several of the greater centers like Chicago, New York, St. Paul, and Minneapolis. Some time ago the subject

was agitated in Cincinnati, but we are not informed whether an ordinance was actually passed or not. The Chicago act was the first in the series, and has served largely as a guide and model.

This measure provides that carbolic acid may not be sold except upon the prescription of a resident physician, and the prescription may not be refilled, nor may it even be filled originally unless presented on the day it is written. To this rigid rule, however, there are three exceptions: the acid may be sold without restriction if (1) it is in solution less than five per cent in strength, if (2) the pure acid, though present in greater strength, is mixed with equal parts of glycerin and alcohol, or if (3) crude carbolic acid is sold (presumably for disinfectant purposes) in quantities of not less than a gallon at a time. All prescriptions must be kept on file and open to the inspection of the police or other constituted authorities for at least three years.

It is not at present known just how thoroughly this ordinance has been enforced, but it is believed that it has met with quite general approval among the Chicago druggists and that it is honestly observed for the most part. Numerous cases have been reported where the glycerin-alcoholic-acid mixture has unwittingly saved the lives of persons who purchased the substance with suicidal intent, which speaks well for the antidotal qualities of the combination.

Unless we are mistaken, the New York ordinance does not provide for the unrestricted sale of this alcohol and glycerin admixture, and this may explain in part why the pharmacists of the city were originally opposed to the measure, and why some of them occasionally protest against it even now. Another trouble in a great city like New York is found in the extreme difficulty of properly enforcing any law or ordinance. The carbolic act has not always been enforced with a strong hand, and under the circumstances pharmacists have sometimes complained that their honesty in observing it has entailed a loss upon them by which others have profited. With this point of view, however, we must confess an entire lack of sympathy.

It has sometimes been argued that it is futile to deny a "suicide" carbolic acid, for he will simply use his wits and decide upon something else to accomplish the purpose. To this objection there are a number of more or less cogent answers. For one thing, many "suicides" doubtless know only of this one agent, for if they knew of others they would certainly not select, in so large a majority of cases, what is probably the most undesirable one of the whole list. Then, too, a few minutes or hours gained by one or more refusals are often enough to cause a change of purpose. Many times the resolve to die is born of a sudden foolish notion, unbearable pain, temporary loss of judgment, or extreme despondency, and frequently wisdom is enthroned again as soon as the gust of passion has passed by.

A proposition to secure a carbolic acid law in Louisiana was voted down at the recent annual convention of the State Pharmaceutical Association after it had once been supported in an earlier session of the same meeting. Nevertheless, the subject is one deserving of careful consideration, and this it is hoped it will receive from the pharmacists of the country —particularly from the pharmacists of the large cities, where the suicide evil often reaches grave proportions.

THE LENHARTZ TREATMENT OF GASTRIC ULCER.

HABERMAN in the *Medical Record* of June 16, 1906, describes this plan of treatment for gastric ulcer. From observations made in an extensive practice at Eppendorf (where 10,000 and some odd number of patients were admitted on the medical side in 1905) Lenhartz concluded that many cases of gastric ulcer do not definitely improve, or do so but very slowly, under the method of retrenched milk feeding, that the high acidity is not measurably lessened, and preeminently this: that if patients are brought into the hospital in a poor physical condition consequent upon one or more hemorrhages, often, indeed, in collapse, the "starvation treatment"—the ice and nutrient enemata and insufficient milk feeding following—not only maintains the patient in his wretched anemic state, but may even drag him into serious inanition; and such an undermined constitution hardly favors the speedy healing

of an ulcer. Moreover, frequent nutrient enemata excite the gastrointestinal tract into peristaltic activity, and may thus induce renewed bleeding; besides, very little nutriment is, after all, obtainable. On the other hand, should more milk be given per os, merely enough to preserve the body weight—three liters for an adult—would overfill the stomach and stretch its walls, thus preventing a contraction of the ulcer and again offering the danger of renewed bleeding. Professor Lenhartz therefore sought another dietary treatment, one that would especially combat the hyperchlorhydria and reënforce the enfeebled and anemic state of the patient, for such reënforcement is imperative in the severe cases, particularly when hemorrhage has occurred; and so the concentrated egg-albumin diet was tried. In case after case the effect proved so gratifying that this method became the routine hospital treatment. The result of such treatment is that the sour regurgitation subsides, the vomiting immediately ceases, the pain and distress after eating disappears within a few hours to a few days, and, finally, an increase in the body weight is manifest as early as the first week. Besides, the improvement is comparatively rapid, so that the patient can be dismissed as cured within a briefer time than formerly.

The following is the tabulated management at the hospital: Absolute rest in bed for at least four weeks. All mental excitement to be avoided. An ice-bag is placed upon the stomach, and kept there almost continuously for two weeks. This prevents gaseous distention, prompts contraction of the stomach walls, thus tending to obviate hemorrhage, and eases the pain when present. On the first day, even where a hematemesis has occurred, the patient receives between 200 and 300 Cc. of iced milk, given in spoonfuls, and two to four beaten eggs. At the same time bismuth is given twice or thrice a day, 2 grammes at a dose, and is continued for ten days. The eggs are beaten up entire (with a little sugar), and the cup containing them is placed in a dish filled with ice, so that they remain cold. Sometimes a little wine is added. This food at once "binds" the supersecreted acid, and therefore mitigates the pain rapidly and causes the vomiting, often quite troublesome, to cease. The allowance of milk is increased 100 Cc. daily, and at the same time one additional egg is given, so that at the end of the first week the patient is receiving 800 Cc. of milk and six to eight eggs. Both these foods are now continued in the same amount per day for another week. For reasons given above no more than one liter of milk a day is allowed at any time.

Besides milk and eggs some raw chopped meat is given from the fourth to the eighth day on, usually the sixth; 35 grammes per day, in small divided doses (easily stirred up with the eggs or given alone), the day after 70 grammes, and later possibly more if well digested. The patient is now able to take some rice or "griesbrei," well cooked, and a little zweiback (softened). In the third week quite a mixed diet is tolerated, the meat being now given well cooked or lightly broiled. All heavy foods are, of course, interdicted, as well as vegetables with husks, etc., and those tending to produce flatulence. At the same time the patient is given strict orders to masticate his food thoroughly.

The bowels are not to be moved, both in order to avoid any peristaltic irritation and to permit the reabsorption of blood that may have passed into the intestine. In fact, one need pay absolutely no attention to constipation in the first week, nor in many cases even to the end of the second. After the second week the bowels are moved with small glycerin injections, or warm water, and after the third week this is done daily if a movement does not occur spontaneously. After this one tries to control the bowels by means of the food, and by having the patient go to stool regularly. For the anemia iron is given in the form of a soft preparation of Blaud's pills, the formula for sixty pills being: Sulphate of iron, 10.0; calcined magnesia, 1.75; glycerin, 30 drops. Two pills are given two to three times a day. These pills are given as early as the sixth, eighth, or tenth day of treatment, according to need, administered at first in a macerated condition. In severe cases arsenic is also given in the form of pills, each containing 0.001 gramme of arsenous acid. These pills are given in gradually increasing doses, three for three days, four for four days, up to seven for seven days, then decreasing again, six for six days, etc. After the tenth day and to

the sixth week bismuth is substituted, given t. i. d. before meals. The patient is usually allowed up on the twenty-eighth day, and is dismissed in the sixth to tenth week.

By this method all patients have been treated in the Eppendorfer Krankenhaus for some five or more years, the treatment being at all times begun at once. Before the Lenhartz method was employed the records of 100 cases showed a recurrence of hemorrhage in 20 per cent of patients. In a series of 135 cases with one or more hematemeses on or just prior to admission, such recurrence was noticed in but 8 per cent of patients, three of whom had at first been in other hands. Among the 135 cases of Lenhartz there were three deaths, one due to severe anemia (the blood examination showing but 17 per cent of hemoglobin on admission), one on the fifteenth day of treatment, due to femoral thrombosis and pulmonary emboli, and one on the twenty-seventh day, the autopsy disclosing five ulcers, one having eroded a duodenal vessel, thus occasioning profuse bleeding. This patient had had many hemorrhages before entering. Of the remaining cases the severest gave the most gratifying results. Those whose blood on admission contained but 35 per cent of hemoglobin or under showed an average weekly increase of 7.7 per cent; those having between 35 and 60 per cent an average weekly increase of 6.34 per cent. In twenty-five cases under the writer's observation during four months there was an average weekly increase in weight of 1.15 kilos. The majority of patients were dismissed as cured before the eighth week. In no case was it manifest that any unfavorable effects were produced by the treatment.

TREATMENT OF THE TOXEMIA OF PREGNANCY.

BRODHEAD contributes a paper with this title to the *American Journal of Obstetrics* for July, 1906. In conclusion he advises the following treatment of eclampsia:

Medical.—During the eclamptic seizure administer chloroform and oxygen if possible. Prevent the patient from biting her tongue, and from injuring herself by blows or falls. If the pulse is full and strong, with tension, give the fluid extract of veratrum viride, minims 10 to 20, hypodermically, and repeat in doses of minims 5 every half-hour until the pulse is reduced to 60. If the Norwood's tincture is used, give minims 20 and repeat in doses of minims 10 every half-hour until the pulse is reduced to 60. In cases of collapse use whisky, morphine and atropine hypodermically. If the pulse is weak and feeble, rely chiefly on chloral and bromides by rectum in doses of 30 to 60 grains of each. Where the pulse is strong use veratrum as indicated, combined with chloral by rectum.

If the patient is unconscious, move the bowels by 3 minims of croton oil given with olive oil one drachm on the back of the tongue. If this is not efficient, give a high enema of sulphate of magnesia and castor oil, of each one ounce. If the patient is conscious, give magnesium sulphate 2 drachms every fifteen minutes until one ounce has been given. Then, if necessary, use the high enema of magnesium sulphate and castor oil. A hot pack should then be given. The colon should be irrigated with several gallons of saline solution, and several quarts left to be absorbed. Intravenous infusion should be reserved for the very severe cases. Venesection, when labor has not yet begun, may be used to advantage in robust patients with a full pulse, 12 to 16 ounces of blood being removed. If, however, the patient is about to be delivered, a moderate blood loss can be allowed in the third stage, and, if necessary, venesection can be performed after delivery. To decrease arterial tension, and as a heart stimulant, diuretic, and diaphoretic, nitroglycerin is also of great value, while caffeine and strophanthus are second only to nitroglycerin.

Obstetrical.—If labor has not commenced, a modified Champetier de Ribes bag should be introduced, and the cervix should be softened and dilated by the use of these bags. When the cervix has been well dilated, complete dilatation by the hand, and deliver by forceps or version.

If labor has already begun, but the cervix is long and rigid, use the bags for softening and dilatation. If the cervix is soft and dilatable, complete dilatation manually and deliver by forceps or version.

If the cervix cannot be dilated by the ordinary methods, Dührssen's incisions or Cæsarian section should be advised, but unless the operator feels perfectly able to perform these operations it would be better, it is believed, to rely on medical treatment alone.

The one fact above all to be kept in mind at all times is that in elimination lies the hope of the patient's salvation.

APPENDICITIS OCCURRING IN CHILDREN.

KIRMISSON and GUINBELLOT (*La Presse Médicale,* May 5, 1906) report twenty-three cases of appendicitis occurring in children less than two years of age. Sixteen died and seven got well. All those occurring in the first year of life perished; 50 per cent of those occurring in the second year of life died. Of the cases terminating in recovery, every one was over eighteen months old. Only one case a year old or less was operated on. They note that the progress of the disease in the first years of life is extremely rapid and the prognosis grave. The only cases that got well were those operated on promptly. The diagnostic difficulty is so great that early operation is not often performed.

HYPOPYON KERATITIS—ANTIPNEUMOCOCCUS SERUM.

It has been shown that most cases of creeping ulcer of the cornea are due to infection with pneumococci, and HELBRON (*Berliner klinische Wochenschrift,* No. 21, 1906) gives an account of attempts to cure the disease by antitoxic serum. The serum was used both by injection and instillation, and although it was of some benefit in mild and early cases, it was ineffective in more severe ones. After trial of all the medical and surgical procedures which have been recommended for this condition, the author has found the following to be the most effective:

The eye being carefully cleansed, a wire galvanocautery at a dull-red heat is passed over the entire surface of the ulcer. A salve of boric acid or corrosive sublimate is then applied and the eye bandaged. If there is a collection of pus in the anterior chamber the cornea is perforated near its periphery by the cautery and the pus removed. The scar left after a cautery wound is much less opaque than that following the healing of an ordinary ulcer.

HERNIA THROUGH THE FORAMEN OF WINSLOW.

The most important points brought out by JEANBRAU and v. RICHE (*Revue de Chirurgie,* Nos. 4 and 5, 1906) are the following:

The symptoms are those of internal strangulation or acute obstruction of the intestine, and it is not possible to determine before operation the nature of the obstruction. A hard mass in the region of the umbilicus or above it, which is variable in percussion note and later is lost in the general distention, is the most characteristic sign. As operation is the recognized treatment of all obstructions the diagnosis is not important.

After opening the abdomen it is best to open the bowel and allow the gas to escape before attempting exploration. The intestinal wound being closed the seat of obstruction will be evident, and in many cases gentle traction on the bowel will suffice for reduction. If this is not sufficient two methods are possible, either to enter the lesser peritoneal cavity through the mesocolon and empty the loops of intestine by puncture, or what is better, to make an incision in the constricting ring. This has often been said to be impossible on account of the proximity of large vessels, but one spot in the wall of the opening is free and may be safely cut.

This operation is performed as follows: The afferent loop, which has been emptied by enterostomy, is drawn down and to the right by an assistant. The operator, having inserted the left index-finger through the foramen and found the root of the liver, cuts the anterior layer of the lesser omentum, close to and parallel to the first portion of the duodenum. The duodenum can then be drawn downward and the layer of peritoneum upward, exposing the root of the liver. Grasping the ductus choledochus between the thumb and finger of the left hand, which protects also the vena cava, the surgeon pierces with a grooved director the posterior layer of the lesser omentum close to the ductus choledochus, and enlarges this opening in

a direction parallel to the duct sufficiently to introduce the index-finger, which enlarges the opening sufficiently to permit the reduction of the hernia. The omentum being repaired, it is wise if possible to close the foramen of Winslow.

Faure, commenting on the operation, considers that it is easier to reach the root of the liver by an incision through the peritoneum between the second portion of the duodenum and the abdominal wall.

EPIDURAL INJECTIONS—INDICATIONS AND TECHNIQUE.

The method described by HIRSCH (*Centralblatt für Chirurgie,* No. 21, 1906) differs from intraspinal injections in that the end of the syringe is placed between the periosteum of the spine and the dura mater.

The method has given good results in the treatment of enuresis, and less striking in that of sciatica. The instrument, which is described and pictured, resembles closely an antitoxin syringe.

The needle is inserted in the foramen at the lower end of the sacral canal, which is a short distance below the last sacral spine and is felt as a triangular depression. The needle is pushed in at right angles to the skin until the membrane closing the foramen is pierced; this is plainly felt. The needle is then turned forward so the point is directed more upward and slowly drawn in.

The syringe is attached, and 10 to 20 Cc. (2½ to 5 fluidrachms) of a 1-to-10,000 cocaine solution in one-fifth per cent salt solution is injected and the syringe removed. The injection may be repeated in two to three days.

Certain difficulties in technique in abnormal cases are treated at length. Of 30 cases of enuresis, 2 were not improved, 4 improved, and 24 were cured.

ABORTION CAUSED BY EXPOSURE OF OVARIES TO X-RAY.

The effect of exposing the ovaries of pregnant rabbits to *x*-rays while protecting the uterus was determined by FELLNER and NEUMANN (*Centralblatt für Gynäkologie,* No. 22, 1906), who found that without exception the death of the fetus promptly followed.

The rabbits were etherized and both ovaries exposed for half an hour twice. In only one case were the fetuses born, and in that still-born. In all other cases resorption took place or was in progress at the time of autopsy.

In every case the ovaries were so completely destroyed as never to regain their function.

FLOATING SPLEEN—SPLENOPEXY BETTER THAN EXCISION.

The dangers of excision of the spleen are emphasized by OPPER (quoted in *St. Petersburger medicinische Wochenschrift,* No. 19, 1906), who shows that the mortality is considerable, while that of splenopexy is none. The operation is performed by making a pocket in the parietal peritoneum and sewing the spleen into this. The spleen is held in place by three silk sutures. The surface may be freshened by rubbing with gauze.

OSTEOPLASTIC ENLARGEMENT OF THE PELVIS.

To retain the increase of size obtained by symphyseotomy or pubiotomy and to make the pelvic outlet permanently larger is the aim of the operation proposed by Credé (*Centralblatt für Gynäkologie,* No. 22, 1906). The technique is as follows:

The left pubic bone is exposed by a semicircular incision, beginning at the right tuberosity of the pubis and ending at the left iliopubic junction. The flap is turned down, exposing the upper angle of the crest of the pubis. The abdominal insertion of the rectus muscle is severed, sparing, however, Gimbernat's ligament. The entire posterior surface of the pubis is exposed "as subperiosteally as possible" for an extent of two inches from the center line, so that the anterior end of the foramen ovale can be reached by the finger. The insertions of the pectineus and external obturator muscles are then severed and the lower border of the pubic bone freed. A Döderlein needle bearing a wire saw is passed from above downward, and the pubic bone sawed through a quarter of an inch from the symphysis, as in the operation of pubiotomy. The split is drawn open about 2 centimeters (four-fifths inch), and the needle and saw passed through the foramen ovale and the vertical ramus sawed through from the foramen to the middle of the first cut in a

direction parallel to the lower border of the pubic bone. Beginning at about the same spot in the foramen a third saw cut is made up through the horizontal ramus 2 centimeters (four-fifths inch) outside the first cut and parallel to it. This leaves a lozenge-shaped piece of bone free, and this piece is inserted between the cut edges of the pubis. The pelvis being released the elasticity squeezes the bone and holds it so firmly that no sutures are required. The bone operation is completed by rounding off any sharp corners or edges.

If the operation is performed at the time of labor, two or three tablets of colloid silver are placed at the bottom of the incision and the wound is closed with rubber tube drainage.

Credé advises that the operation be performed early in pregnancy when indicated, as the danger of infection is thus lessened, but the only case in which he has performed it was in labor, and in spite of this union was *per primam* and the puerperium undisturbed.

FETAL HEART SOUNDS HEARD IN FOURTH MONTH.

To hear the fetal heart only in pregnancy SCHWAB (*Centralblatt für Gynäkologie,* No. 22, 1906) found that he could press the left hand down just above the pubis until the spine was felt and then work it gradually up until the fetus was compressed firmly in the upper part of the uterus. By listening over the most prominent part of the womb he was able to hear the heart distinctly in a case of eighteen weeks' pregnancy in which death of the fetus had been suspected. He recommends the method for all early cases.

SPINAL ANESTHESIA FOLLOWED BY DEATH.

In the case reported by KÖNIG (*Münchener medicinische Wochenschrift,* No. 23, 1906) the patient had been drinking heavily, and had fallen while drunk and fractured the patella. The spinal fluid which escaped before the stovaine injection was made was slightly blood-tinged, which may have indicated a lesion of the spinal cord. An injection of 0.06 gramme (9/10 grain) of stovaine was given between the third and fourth lumbar vertebræ. The paralysis of motion and sensation, which followed as usual, did not pass off at all, and death followed from cystitis, bed-sores, and exhaustion. It is possible that the cord may have been somewhat injured by the fall, and the blood-stained fluid points in that direction. Spinal fluid drawn several days after paralysis was sterile, so infection is excluded.

FRACTURES — TREATMENT WITHOUT IMMOBILIZATION.

The treatment upheld by DEUTSCHLANDER (*Berliner klinische Wochenschrift,* Nos. 20, 21, and 22, 1906) is termed by him functional treatment, because it differs from the usual methods in that these attempt principally to preserve the form of the bones, and the new method aims to conserve the function of the limb, and thereby the form best adapted to function, namely, the normal.

He shows that fractures of ribs and other bones which cannot be held perfectly still heal without false joints, and claims that all the processes of union are favored by motion of the neighboring joints and contraction of the muscles alongside the fracture. The motion of neighboring parts prevents congestion and thrombosis and favors the removal of clotted blood and detritus. The motion of the joints prevents the effusion into them which so generally follows fracture of neighboring bones treated by the usual methods, and thus avoids the new formation of connective tissue which is apt to result from long-continued effusion, and whose contraction often permanently injures the joint.

The method consists in the use of massage and passive motion and carefully regulated limited active motions of nearby joints. Pain is relieved by this method and swelling removed. The local irritation from friction together of the broken bone ends stimulates cell growth and callus formation. When the callus is still soft and elastic, gentle contractions of the muscles of the part will bring the bone into the position in which those motions are best performed, and thus tend to restore normal relations. If a person with a fractured bone moves the joint below, it will be found that the contraction of certain muscles brings the bone

fragments into natural position, and this position should be used as the basis of movements. Of course, if there is much dislocation the fracture must be reduced. Tendency to contraction in muscles may be relieved by massage. While the motions are not being carried out the limb should be held by a gutter or other easily removed dressing. The motions must always be slow, and the parts supported by the surgeon while they are carried out. Pseudarthrosis has never been reported in a fracture treated by this method. The motions must of course be such as tend to bring the fragments into position. The author gives no special directions for particular fractures.

HERNIA IN INFANTS—TREATMENT.

The entire subject is treated at length by MOELLER (*Presse Médicale Belge*, No. 22, 1906), who makes the following divisions:

1. Umbilical hernia. Unless this is of enormous size it rarely demands operative treatment, and almost always heals spontaneously. Its formation is favored by attempts to remove the umbilical cord prematurely, and the stump of this should therefore be left until it separates of itself, and traction should never be exerted upon it. Unless the hernia sac reaches the size of a small orange the treatment should consist merely in the wearing of a flannel binder or a button held by adhesive strips. This treatment should be continued until the seventh year, after which spontaneous cure is less likely and operation may be advisable, especially in females. Operation consists in the excision of the navel by an elliptic incision down to the peritoneum, followed by excision of the peritoneal sac and the fibrous ring. Sutures are passed through the entire wall at a distance from the edge, then through the opposite wall also from without in, and return by the same route, making a loop inside. When the ends are tied together the walls thus are made to override or lap. The recti muscles may be united by a second series of sutures if desired.

2. Inguinal hernia. This may recover spontaneously even in marked cases up to the age of one year, and may be cured by bandages until about the seventh year. After six months an elastic bandage should be applied, or a skein of cotton is passed around the lower abdomen and tied in a knot over the hernial orifice; the ends of the skein are passed around the thigh and tied behind, holding the knot firmly in place. Even after apparent cure the bandage must be worn from half to one year, according to the age. The operation for radical cure should rarely be performed before the age of eighteen months. If the hernia gives no trouble operation may still be deferred. The best operation, at least before the fifth year, is that of Lucas-Championnière. An incision of 1 to 1½ inches is made in the inguinal region and the external ring exposed. The cord is freed entirely, and the sac opened and ligated by two looped ligatures. The internal ring is then closed, and the aponeurosis of the external oblique and the skin closed in layers. After the age of six years, or in the case of very large hernias, the Bassini operation is preferable.

THE TREATMENT OF CURVED TIBIA IN INFANTS AND YOUNG CHILDREN.

GANGEE (*Birmingham Medical Review*, July, 1906) states that cases of rachitic curvature of the tibia may be divided into several classes. It usually appears in the form of an outward bend, with the point of greatest curvature just below the center of the bone. The sharp area of curvature may be near the joint or near the ankle. When rickets is still in the active stage, if the bone remains bendable, the wearing of an apparatus is serviceable. The child should be kept altogether off its legs. A padded splint is applied on the inner side of the leg, reaching from the inner tuberosity of the tibia to a point three inches below the sole of the foot. To this splint the leg is firmly bandaged. For an hour night and morning the leg is manipulated. Or a pad of wool may be placed between the knees, and another between the malleoli, and the legs bound together. There is, however, the danger of knock-knee. If there is no sign of "give," osteotomy or osteoclasis is indicated. Breaking of the bone is accomplished against the rounded edge of a board by sudden violent pressure. Gangee holds that the subsequent use of a leg iron is not needful. There is always possible danger of a fracture not

uniting, and there is a belief to the effect that when this complication occurs in a rickety child no operative treatment will secure union, and amputation will be needful. In the class of cases characterized by sharp bowing just above the ankle, treatment by any kind of apparatus is most unsatisfactory. Osteotomy and splints are both used, however, for the purpose of securing some betterment.

The same gloomy prognosis can also be held out in regard to anteroposterior curvatures. As a rule these should be let alone.

ECLAMPSIA—EFFECT OF LUMBAR PUNCTURE.

The fact that intraspinal pressure is always increased in eclampsia led THIES (*Centralblatt für Gynäkologie,* No. 23, 1906) to try its effect on fifteen cases which had not yielded to other methods of treatment.

Strangely enough its effect was least noticeable in those cases in which the pressure was highest. All these died without any lessening of the convulsions except one, which showed multiple hemorrhage into the cord at autopsy. Only six of the cases recovered, and it is doubtful whether any of these owed their recovery to the puncture.

On the whole Thies is non-committal as to his opinion of the method, while Zweifel in discussing the paper condemns it strongly on the basis of his experience.

It causes diminution in the secretion of urine, and Garten shows how dangerous such an effect may be in eclampsia, especially as anuria has occasionally been reported following lumbar puncture.

FOOTBALL INJURIES.

WILBUR (*California State Journal of Medicine,* June, 1906) gives the list of football injuries which came under his observation for five years at Stanford University. He notes that most of the men were hurt in practice rather than in match games, that a number of the injuries occurred early in the season, and that the victims were freshmen or beginning players. Under the heading of sprained or wrenched knees are found the largest number of cases. The majority of these injuries were severe enough to be followed by effusion into the synovial sac.

Treatment was directed to getting the injured members in working order in the quickest time compatible with the interest of the patient.

Fractured ribs without displacement soon get well enough for active work if protected well with adhesive plaster and covered with sole-leather pads. Knee injury is usually associated with sprain or tear of some part of the lateral ligament involving the synovial membrane; often associated with loosened or broken semilunar cartilage or locking of the joint; or is sometimes expressed in the form of a tearing of the quadriceps. When seen early without effusion of the joint these injuries are treated by zinc oxide adhesive dressing, strips being first put on along the line of the injured ligaments (up and down the leg), and then circularly, covering the whole joint. Two-inch strips are used, torn part way down the center from each end, so that four one-inch tails are obtained. The broad, untorn central part of the plaster is placed posteriorly and the ends brought around above and below the center of the patella respectively, until the whole joint is covered. The leg should be bent slightly when this dressing is completed; it is covered with a roller bandage. The patient is then put to bed, the limb is elevated, the knee covered with ice-bags, and a saline cathartic given. After twenty-four hours the patient can get up on crutches. After a few days a second bandage is applied. If the knee is strong and free from pain except in special positions, a gap is left in the plaster posteriorly to permit of motion, and the patient walks with a cane. In ten days in favorable cases the patient is ready for light work, but for three weeks or more he wears an adhesive plaster bandage covering the kneecap and the lateral portions of the joint, but separated enough behind to permit of running.

When the patient is not seen until effusion has taken place he is put to bed for twenty-four hours before the application of the plaster. When cartilages have been loosened great care is exercised in permitting the use of the joint. For some time after the injury adhesive plaster supports must be worn when much strain is to be expected. Regular massage is very helpful if the active symptoms have subsided. In the later stages

an ointment made up of guaiacol, oil of turpentine, and oil of wintergreen with lanolin is very useful in relieving the pain and soreness following the use of the joint. Injuries of the ankle are treated in the same way, though until the ankle is free from blood it is not safe for heavy work, as the adhesive plaster is too far away from the injured ligament to give it support. Tears of muscle are readily treated by applying plaster in the direction of the fibers of the muscle and securing it in place with circular strips. After three to six days active work may be taken up if the dressing is kept on. When the insertion of a muscle is torn from the bone a longer time is required. Injuries of the muscles of the neck are often very troublesome, but a strong collar of adhesive plaster, with the back of the neck well covered in, gives much comfort and permits of early playing.

The author believes that combined early rest and ambulatory treatment produces as good terminal results as are obtained in injured joints treated along more conservative lines, and he is a thorough believer in the efficacy of close-fitting adhesive plaster dressings.

THE MANAGEMENT OF A CASE OF LABOR.

PURSLOW (*British Medical Journal*, June 30, 1906) in the course of the Ingleby lectures on this subject calls attention to the unsatisfactory training of medical students in this important branch of medical practice, holding that the giving of a certificate on the basis of attendance on twenty labors, which is apparently the English requirement, affords an absolutely inadequate protection to the public.

As to preliminary examination, when the practitioner is first consulted by his patient in the early stage of pregnancy Purslow holds that it should not be insisted upon unless there be a history of rickets in childhood, or the presence of an actual deformity, as distorted spine, or bent legs, or dwarfed stature, or kyphosis, or disease of the hip-joint, loss of a leg, or lateral curvature, suggesting some form of oblique pelvis.

In multiparæ the history of previous labors may be taken as a safe guide. An examination may be urged when the occurrence of previous difficulties in delivery suggests a contracted pelvis. Systematic examination of urine is insisted upon, and the nurse engaged should have had a course of instruction in a lying-in hospital. Neither nurse nor doctor should suffer from suppurating aural discharges.

Moreover, Purslow objects to the bearded obstetrician. The patient is given a bath at the onset of labor. She is then given a clean vest, night-dress, skirt, and stockings, and should thereafter use utensils in the room instead of going to the water-closet. Where a bath is not practicable the vulva should be washed with soap and water.

As to the hands of the accoucheur, it is advised that he always wear rubber gloves in examining or operating on septic cases. The immediate preparation is accomplished by soap and water and a 1:2000 solution of bichloride of mercury. Purslow particularly cautions against wearing rings during delivery of the child, and also notes that the shirt cuffs should be turned up. The antiseptic vaginal douche is omitted, but in every case a rectal enema is given at the beginning of labor. The use of a lubricant for the fingers before making vaginal examination is advised. A second examination is considered desirable after the membranes have ruptured. It is suggested that during the course of the labor the vulva should be cleansed at frequent intervals, and when the head reaches the vulvar orifice the parts should be kept clearly in view until labor is completed.

In the treatment of inertia in the first stage, if the membranes are not ruptured simple, nourishing food and rest are advised. Five grains of quinine repeated two or three times is said to have a marked effect. In the treatment of the exhaustion of the voluntary and involuntary muscles of labor Purslow seems to have had admirable results from the administration of sugar.

On the question of posture his remarks are particularly interesting. He quotes Felkin to the effect that in Central Africa the women of the tribes assume a semi-squatting posture, and that among primitive peoples the parturient woman always avoids the dorsal decubitus.

Purslow avoids dogma on the subject, and advises that in labor the patient should be given greater liberty, and

should be permitted to follow her instinct, in regard to her movements, more freely than is now customary.

The worst attitude of all is the usual left lateral on the modern spring bed; the latter invariably sinks down in the middle, and if the hips are brought to the edge of the bed, as is usual, they are at a distinctly higher level than the remainder of the body, and the expulsive powers are consequently working against gravity instead of being favored by it.

With the application of forceps a very little chloroform is given, and traction is made only during pain. Purslow keeps them on until labor is completed, as by this means the head can be kept well forward under the pubic arch, and the strain on the perineum considerably relieved; moreover, the speed of delivery can be exactly regulated.

Rupture of the perineum by the shoulders may be avoided by preventing the shoulders from emerging together.

As to the third stage of labor, Purslow strongly advises against violent squeezing or kneading of the uterus either before the child is born or afterward. In all but a small percentage of cases the uterus is competent to expel its contents without assistance. This may require half an hour. It is well to place the hands at frequent intervals upon the uterus, as otherwise it may distend with blood to a dangerous extent. If this distention is felt to be taking place, gentle kneading movements, to insure contraction, may be used. The placenta may be more readily brought down when less pressure on the uterus is employed, and the exit of the placenta assisted by gentle traction on the cord.

After delivery of the placenta the vulva is washed with an antiseptic lotion. Purslow advises that the labial hair be trimmed with scissors if it is at all long. A clean napkin or antiseptic pad is then applied. If it has been needful to introduce the hand into the uterus for the purpose of removing intra-uterine placenta, an intra-uterine douche, usually lysol, is given, administered by means of a glass funnel, about 2½ feet of rubber tubing, and a glass vaginal or uterine tube. Silkworm-gut is used for perineal rupture; the binder is usually applied, and is particularly indicated if there has been loss of blood.

Purslow states that he is not in unison with those practitioners who are in favor of placing a book or a pin-cushion or a hard substance over the uterus before applying the binder.

In the after-treatment the patient is turned from side to side, and after the fourth day is lifted into the vertical position in bed for a few minutes daily, to facilitate the escape of the lochia. A fortnight is the minimum length of the puerperium.

METHOD FOR PREVENTING VOLVULUS OF THE SIGMOID FLEXURE.

MOSCHCOWITZ (*New York Medical Journal,* July 14, 1906) prefers sigmoidopexy as a means of preventing volvulus—that is, the anchoring of the sigmoid flexure to the anterior abdominal wall, by a row of catgut or silk sutures. Further, he records a case of acute obstruction with great tympany associated with diminished rectal capacity and absolute constipation. Operation demonstrated a volvulus of the sigmoid. The bowel was stitched to the left half of the anteroabdominal wall by a number of silk sutures to the extent of about 2½ inches. At the end of three weeks the patient was apparently ready to be discharged, but a few days later complained of pain and tenderness on deep palpation, later followed by distention and symptoms of intestinal obstruction. The abdomen was opened through the cicatrix of the first operation. There was found an incarcerated hernia of the small intestine between the lateral abdominal wall and the sutured sigmoid.

Moschcowitz calls attention to the danger of internal strangulation following fixation of the sigmoid.

There are objections to all methods of fixing the sigmoid. In spite of his own unfortunate experience the reporter believes that sigmoidopexy is the best possible method to prevent volvulus if the local conditions are favorable.

INJURIES TO THE DIAPHRAGM.

KIRCHNER (*Interstate Medical Journal,* August, 1906) records four cases, and notes that the symptoms of the condition are obscure and may be wanting. The importance of positive diagnosis by tactile or ocular demonstration is insisted on. The chief dangers resulting from the injury are penetration of the abdominal

cavity, injury to viscera, hernia or prolapse of viscera into the pleural cavity. Prompt repair of the injury is advocated. This implies suturing of the free portion —*i.e.*, that unprotected by the liver.

THE PREVENTION OF DIFFICULT LABOR.

HERMAN (*British Medical Journal*, June 30, 1906) laments the still high mortality of childbirth, holding that 4.1 per cent from puerperal sepsis is not justifiable, and that improvement in this respect is not as rapid as it should be. The first cause of fatality is laid to the door of ill-trained medical men and ignorant midwives. Then comes the case due to disproportion of the size of the child and that of the pelvis. This disproportion may cause death by mechanical difficulty in labor or by favoring hemorrhage; in either case death is avoidable. Eclampsia as a cause of death seems to be beyond reach, since it can neither be predicted nor prevented; nor is absence of albumin from the urine a guarantee against this complication.

Rupture of the uterus in easy labor is another cause of death which can neither be predicted nor prevented. The same may be said of acute yellow atrophy of the liver. The deaths due to the mechanical disproportion can be prevented by examination during pregnancy not later than the seventh month. The disproportion can then be detected and safe means taken to prevent its having any ill effect upon the mother.

Herman even goes so far as to lay it down as a rule that mechanical difficulty in labor implies that the person has been advised by incompetent persons, since if she comes at the seventh month the causes of difficulty can be observed and can usually be remedied. If she does not come this means that she has been badly advised by some one. If by examining the patient at the seventh month the child is found to have reached the full average size, the proper course is to prevent a difficult labor by inducing premature labor. Not only is it quite as able to take care of itself as an average child, but its premature birth is better for it, because it would probably be injured by the difficult labor of term if this were allowed to take place. If this induced labor is conducted with precautions to secure cleanliness, it is held to be no more difficult than labor at full term. Moreover, the date can be arranged, which is a convenience both for the doctor and the patient, and an effective set-off to the slightly longer labor. The method devised is the introduction of a bougie between the membranes and the uterine wall, thereafter leaving the case as much as possible to nature. This bougie does not require to be tied in, but pushed up as far as it will go. Pains usually begin within twelve to twenty-four hours. If this fails the cervix is dilated with Hegar's dilators until a Ribes bag can be introduced. When the patient is becoming exhausted by obstructed labor the treatment advised is craniotomy rather than Cæsarian section.

The treatment suggested for accidental hemorrhage is Cæsarian section, though not unless the hemorrhage be so serious as to gravely threaten life. In hemorrhage due to placenta previa the Ribes bag is advised.

Postpartum hemorrhage is avoided by not exerting traction if the uterus is not acting and by the careful emptying of the uterus.

TREATMENT OF BONE CAVITIES.

MOORE (*Journal of the American Medical Association*, Aug. 4, 1906) believes that a new era in bone surgery has dawned incident to the use of Moorhof's bone wax, made of 20 parts of iodoform, 40 parts of spermaceti, and 40 parts of oil of sesame. The ingredients if slowly heated to 100° C. and then allowed to cool form a soft solid which remains solid at body temperature. For use it is heated to 50° C., being constantly stirred to keep the iodoform distributed. This hot liquid is poured into the cavity, where it immediately solidifies. It possesses the inhibitory and medicinal properties of iodoform without causing poison, and is gradually absorbed and replaced by granulations and finally new bone. It is not applicable to acute infections. Before this method is employed the cavity must be made sterile and dry. When the bone wax is to be used the opening in the bone need not be larger than is necessary to permit the removal of the sequestrum and the thorough cleansing of the cavity. The periosteum must be carefully preserved,

as it makes an important covering for the wax plug. After removal of the sequestrum and thoroughly curetting out débris the cavity is washed and dried and thoroughly swabbed with 95-per-cent carbolic acid. After two minutes the acid is wiped out and the cavity washed with alcohol, after which it must be thoroughly dried, as moisture will prevent the melted wax from penetrating every crevice in the bone, which is necessary for the success of the treatment.

Moorhof uses a hot-air blast for this purpose. The melted wax is poured in, and as soon as it is hardened the periosteum and other tissues are closed by catgut sutures. When there is a good periosteal covering no drainage is necessary. When the soft parts come in contact with the wax it is advisable to provide temporary drainage by means of strands of catgut or small strips of rubber tissue. In most cases, when no drainage is necessary, primary union is secured, but in a few there will be some oozing of serum between the stitches for a few days, after which union takes place. In drain cases the wounds commonly close promptly on removal of the drainage. Occasionally serum and particles of iodoform escape for some time. If the wound becomes infected this infection is superficial. In old cases in which there is loss of soft parts so that the wound cannot be closed, the cavity can be curetted, disinfected, and filled with wax, which will sometimes remain under a dry gauze dressing until it is gradually absorbed and replaced by granulations.

PROPHYLACTIC TREATMENT OF PUERPERAL ECLAMPSIA.

CLARK (*Surgery, Gynecology, and Obstetrics,* July, 1906) holds that the first step in the treatment of puerperal sepsis is the education of women to engage their physicians early in pregnancy. The latter should give careful instructions in regard to diet, bathing, rest, and attention to the condition of the kidneys and bowels. Moreover, the patient is instructed to carefully measure the quantity of urine passed, to send samples occasionally for examination, and to drink large quantities of water. She is cautioned to notify the physician at once in case of persistent headache, difficult vision, return of nausea, diarrhea, marked decrease in the amount of urine passed, and edema of the extremities, especially of the hands and face. When one or all of these symptoms develop the patient is put on a milk diet with large quantities of water and a saline is given. If there is improvement in symptoms and the condition of the urine justifies it, this diet is gradually increased to include some of the more easily digested starchy foods. Neither milk nor eggs are allowed till after labor. When the symptoms become more severe in spite of this treatment, or begin with marked severity, rest in bed is indicated, warm baths each day, and at times hot packs. If the symptoms still progress unfavorably labor must be induced without delay. Where labor comes without convulsions, though these be threatened, chloral is administered and is continued during labor as conditions seem to indicate. If the examination of the urine during labor shows increasing symptoms of convulsions, labor should be terminated and measures adopted as though convulsions had already occurred—*i.e.,* saline cathartics, the subcutaneous injection of normal saline solution, and the use of hot packs.

Clark holds that if albumin and symptoms of toxemia occur early in pregnancy the uterus should be emptied.

FRACTURE OF THE CARPAL SCAPHOID.

BECKER (*Surgery, Gynecology, and Obstetrics,* July, 1906) observes that most of these fractures are treated as sprains. Persistence of pain and disability and loss of strength in the affected wrist compels the patient to seek medical help. There is thickening and swelling on the radial side of the wrist, with blurring of the lines of the anatomical snuff-box. The local tenderness is found directly over the scaphoid bone itself, and can best be felt in the anatomical snuff-box by pressing hard with the thumb against the broken scaphoid. Pressure produces agonizing pain. Forced extension causes muscle spasm. There may be neither crepitus nor blood effusion. Positive diagnosis is made by the *x*-ray. The injury is characterized by persistence of symptoms longer than usual for cure of sprained wrist.

The expectant treatment, if a case be recognized early, is usually satisfactory. In cases which have not been recognized and

which have not been kept at rest, but in which weakness and pain persist, removal of the proximal half of the scaphoid or of the entire bone is indicated.

ANESTHESIA IN THE FIRST STAGE OF LABOR.

NEWELL (*Surgery, Gynecology, and Obstetrics,* July, 1906) holds that the overcivilized modern woman represents a type unfit to bear pain, and that the practice of obstetrics must be changed to meet the new conditions which have arisen. He holds that the general practitioner should not attempt to attend obstetrical cases when the specialist can be employed, because he is usually unable to foresee and forestall complications. Newell believes that the suffering involved in labor deserves relief, and at the very beginning he gives his patient ether when she wants it to the degree of dulling sensibility. He has seen no increased tendency to hemorrhage, no prolongation of labor, nor has there been an added infant mortality—indeed, far from delaying, it expedites. The effect of prolonged administration of ether on the children has been noticeable in a considerable proportion of the cases, and many children are fairly deeply etherized and require careful resuscitation. Newell states that in about 75 per cent of his cases he has terminated labor by operation, because he believes that the nervous and physical exhaustion entailed by the so-called second stage does more harm than a carefully performed operative delivery. Indeed, he holds that the majority of patients would react much more favorably after a short labor terminated by operation than after a prolonged natural labor. In two of his cases delivery was followed by acute collapse in the absence of hemorrhage, which lasted for several hours, but was followed finally by reaction and recovery. This he attributes to dilated heart, which might have been avoided in both cases by earlier operation, thus sparing the patient from the strain of labor. Indeed, he holds that early anesthetization is a safeguard against this complication.

In forty-one cases he has employed scopolamine-morphine anesthesia. Ordinary doses consisted of 1/200 of a grain combined with 1/6 grain of morphine given hypodermically. In twenty-seven cases the dose was given only once, and in fourteen cases the dose was repeated at least once. In only two cases was scopolamine given without morphine; in one morphine without scopolamine. In a third of the cases receiving but a single dose symptoms were not relieved. The second stage of labor is unsatisfactory in certain cases. There was moderate postpartum hemorrhage in four cases; in two others the action of the uterus after completion of the third stage was unsatisfactory, this often showing a tendency to relaxation.

Three patients vomited throughout labor following a single dose. One patient exhibited a poor pulse after repetition of the dose, rate being 150, and the patient's condition being distinctly alarming. Two patients given scopolamine without morphine experienced no marked relief from pain.

As regards the action of ether during the first stage it is more certain, and less liable to be followed by uncomfortable after-effects, than the use of scopolamine and morphine, though its administration involves more trouble to the attendant.

THYROTOMY VS. LARYNGECTOMY.

JACKSON (*Pennsylvania Medical Journal,* July, 1906) again calls attention to the diagnostic import of chronic hoarseness and the need of recognizing malignant growth of the larynx in its early stage, while it is still operable by thyrotomy, whereby the comfort and the usefulness of the patient may be conserved. As to endolaryngeal operation, he considers the years of training to acquire skill in this method an utter waste of time, in so far as the surgery of the malignant disease is concerned, and that it is ten times worse than letting the growth alone, since not only does it fail to cure radically, but it induces local spread and metastatic deposit. If the disease be discovered late total or partial laryngectomy will probably prolong life for a variable period, but recurrence is fairly certain, and the short extension of existence lacks many pleasures and comforts. The early curable stages of laryngeal cancer are characterized by nothing but hoarseness, which may disappear and recur. Cough, odor, pain, odynophagia, glandular involvement, external swelling, emaciation, and cachexia are present only after the

curable stage is past. The surgery of malignant disease in the larynx is discouraging only when the disease is seen late. In early thyrotomized cases the prognosis is better than in chronic laryngitis.

POST-TYPHOID PERIOSTITIS AND THE TYPHOID SPINE.

WILSON (*Medical Chronicle,* August, 1906) states that during the past ten years of 1618 cases of typhoid fever treated at the London Hospital there is mention of subsequent periostitis in 15, which, of course, do not represent all those that occur. In comparison with other acute specific fevers this complication is common: thus of 41 cases of bone lesion, 37 occurred after typhoid fever. Periostitis usually occurs about two or three weeks after the fall of temperature. The patients complain of sharp, shooting pains, and shortly bone swelling, which becomes red and hot and eventually fluctuates. After incision an intractable sinus persists. The tibia is the bone commonly affected. The ribs are next in frequency, and more than one bone is sometimes involved. Many of the cases do not suppurate.

Bacteriological investigation has shown that the typhoid bacilli are able to produce suppuration, and in some cases the pus in these post-typhoidal ulcers has yielded pure cultures.

The typhoid spine is the term adapted to the post-typhoidal condition characterized by acute pain, sometimes preceded by weakness and aching in the back from the time the patient first begins to sit up. There is often a history of preceding strain. The pain is often paroxysmal and associated in its intensity with voluntary muscular rigidity. Pain is usually in the lumbar region. Physical signs are usually absent, though there may be swelling and tenderness. There is commonly slight pyrexia. Hysteria or spinal cord symptoms are noted. Thus increased knee-jerk was reported in nine cases; it was absent or very weak in three; in two cases there were areas of anesthesia in the legs. Incontinence of urine and feces has been noted, the latter in association with loss of knee-jerks and cramp in the legs. The affection lasts about four months, the pain persisting for many weeks, being characterized by remissions and exacerbations. Complete recovery is extremely slow.

Treatment advised is rest in bed with fixation of the spine by mechanical contrivance. In some cases extension produces marked relief of pain. Counter-irritation and massage in the acute stage do harm. Morphine is the only drug of service, and even this fails in the acute paroxysms. Prognosis is good. The condition is regarded by Osler as irritable spine. The ordinary explanation of the condition is based on the assumption that there is present post-typhoid periostitis, doubtless involving the nerve roots or even the spinal cord. There have been no cases of suppuration, though the frequent advent of temperature suggests infection. The cases of well-marked spinal deformity add further proof to this theory.

INTERNAL DERANGEMENT OF THE KNEE-JOINT.

THOMAS (*Liverpool Medico-Chirurgical Journal,* July, 1906) states that if a joint which has been previously normal suddenly locks as the result of injury, the most probable cause is a damaged cartilage, and the site of the greatest pain indicates whether it is the internal or external cartilage. If the limb be seen in a locked condition some inequality will generally be found along the margin of the semilunar cartilage—either a slight prominence due to the projection of a fractured piece, or more commonly a depression resulting from the damaged portion having swung into the joint. In examining for this condition the patient's lower extremity is placed across the surgeon's two knees.

PUERPERAL ECLAMPSIA.

BLAIR (*Liverpool Medico-Chirurgical Journal,* July, 1906) refers to the toxemia theory of puerperal eclampsia as the most modern. This has for its basis the assumption that a toxin or a series of toxins manufactured by mother and fetus, and not eliminated in sufficient quantity by the kidneys, is the chief cause of eclampsia.

He notes that the mortality is from 18 to 42 per cent for the mother and 50 per cent for the children, and it occurs prob-

ably once in 330 labors, in the United States in 260 labors, and is more frequent in cases of illegitimacy. It is commonest in primiparæ, in cases of protracted labor, in women of neurotic temperament, and in multiple pregnancy. Usually the onset is from the eighth month to the end of pregnancy, though it may occur at any time from the beginning of pregnancy and during the puerperium. Prodromal symptoms are albuminuria, visual disturbances, vertigo, headache, drowsiness, depression and epigastric pain, low specific gravity of the urine, jaundice, and vomiting. The latter when it comes on late in pregnancy is always suggestive. The attacks themselves are characterized by a preliminary stage in which there are convulsive movements of the face, head, arms, etc., which last for a few seconds to a minute or more, followed by a tonic stage in which the patient becomes rigid, with the head drawn backward and the body in the posture of opisthotonos. Respiration ceases. This stage lasts from fifteen to thirty seconds, and is followed by a clonic stage of general convulsive movements. The coma becomes more profound as the fits increase in number, the pulse becomes weak and intermittent, and the temperature has a tendency to rise. It can thus be distinguished from epilepsy, in which there are no eclamptic prodromata, nor is there a steady increase in temperature; from hysteria, characterized by the rationality of the convulsive movements, the absence of respiratory spasm, the passage of larger quantities of urine; from alcoholic delirium and from disturbances of the central nervous system. Prophylaxis consists in the adoption of every measure which tends to promote the general health. Special attention is paid to emptying the bowels and the proper function of the kidneys. The author is strongly in favor of morphine given hypodermically and the use of saline solution either into the areolar tissue or by the bowel or by transfusion. Chloroform is rejected as a routine measure, though it may be given occasionally to relieve spasm. Chloral hydrate is urged in large doses. Lavage of the stomach and hot and cold packs are also advised. Emptying of the uterus is considered in case other methods fail to stop the fits.

INFECTION OF OPERATIVE WOUNDS AND THE METHOD OF PREVENTION.

DÖDERLEIN (*Centralblatt für Chirurgie,* No. 28, 1906) notes that in spite of the most careful aseptic precautions incident to modern technique and surgery, including rubber gloves, face masks, and the coating of the operative field with a thin layer of rubber, every abdominal wound shows the presence of bacteria, suggesting that it is impossible to obtain an absolutely germ-free wound.

Döderlein believes that the surgeon's hands and the skin of the patient are the main sources of this infection. Nor is it possible by any form of disinfection to thoroughly cleanse the deeper layers of the skin. It is, however, possible to inhibit the growth of these germs and to prevent them from reaching the surface, and for the attainment of this end Döderlein suggests the following method: After the ordinary methods of thorough cleansing in cases of proposed laparotomy, the skin of the belly and the upper parts of the thighs are rubbed with iodine-benzine or formalin-benzine, and then painted with pure tincture of iodine. Over this painting there is applied a thoroughly sterile solution of rubber, which makes a thick membrane. After a few minutes the solution is dried and rendered non-sticky by moistening with benzine and dusting with sterilized talcum, thus forming a smooth, shining, sterile membrane intimately connected with the skin, which throughout the entire course of the operation prevents the escape of the germs, and after the operation is readily washed off with benzine. Numerous bacteriological studies demonstrated the efficacy of this procedure. Broome speaks most favorably of this method, which is used in his clinic. He states that the artificial pellicle adheres tightly, is absolutely efficacious, and that a sterile operation is possible even in the presence of an infection. To the commercial solution of rubber he adds iodine-benzine in such proportion that two per cent of iodine is present, and precedes the application of this pellicle by painting with a one-per-cent solution of iodine-benzine.

Heusner altogether rejects the preliminary painting of the skin, and relies upon the use of an iodine-benzine solution containing a little paraffin oil.